THE IRON TRADE REVIEW

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STEEL-MAKING IRONS

CONTRIBUTE ACTIVE FEATURE OF PIG MARKET.

Foundry Grades Stand Test of Dull Conditions — Heavy Specifications on Finished Products.

Extremely heavy specifying against contracts for finished material continues, and will probably be maintained throughout this month, as consumers are anxious to specify on all that is coming to them at lower prices than now prevail and mills are canceling tonnages not specified strictly according to contract. The pig iron market in foundry grades is standing the test of dullness very well, although some furnace interests in the central west and middlemen holding southern iron are willing to make concessions.

Fort Henry Ore Prices

Prices on Port Henry, N. Y., ore for next year have been announced, and represent an average advance of about 40 cents per ton. These prices are lower than in 1907. Dec. 20 is the limit to take advantage of this allotment, about 1,000,000 tons being available. Lake Superior iron ore interests have not yet taken any action in regard to prices, but the placing of reservations continues.

Plates and Shapes

Bookings of the American Bridge Co. during November were about 63,000 tons of structural material out of the total of about 100,000 tons placed, the percentage taken by the leading interest being larger than usual. The Whitehall building, New York, 10,000 tons, has been awarded to the Brown-Ketcham Works, Indianapolis. Lackawanna steel will be used. It is estimated that about 30,000 tons of plates will be required for pending aqueduct and rivet pipe contracts in different parts of the country, including a line for Portland, Ore., requiring about 11,000 tons, and one for Portland, Me., about 6,000 tons, the Catskill aqueduct, at New York, requiring 6,300 tons, and the Brooklyn water works extension. While most of the recent inquiries for cars have been disposed of, it is understood that there is an exceedingly large amount of absolutely new car business in prospect, and that if it results in orders, as expected, there will be a shortage of shapes and plates. Already structural material is being shipped long distances to meet urgent needs, as, for instance, from a warehouse in Chicago to Cleveland, where the delivered price is $43 per ton, $9 above the mill price, the premium being paid for prompt shipment.

Sheets and Tin Plate

Specifications against contracts for sheets are extremely heavy. The tonnage entered by the principal interest during November was the largest of any month in the history of the company. The tin plate mills are also receiving heavy specifications, but new business in both sheets and tin plate shows some decrease.

Pig Iron Sales

Pig iron activity of the week was confined almost entirely to steel making irons. In the east, 25,000 tons of basic were sold. In the Pittsburg district, 18,000 tons of Bessemer for first quarter were taken by the Republic Iron & Steel Co., and 10,000 tons by another interest whose identity has not been disclosed. Bessemer sales for November amounted to 69,300 tons. The average Bessemer price for November was $19, valley, and the average basic price, $17.31, valley.

HEAVY SALES

OF BESSEMER MADE DURING THE MONTH

Include Large Tonnage Taken by Two Interests During Past Few Days—Basic and Bessemer Averages.

Pittsburg, Dec. 1. (By wire.)

The strength of the Bessemer pig iron market is clearly portrayed in the review of sales by furnaces in Pittsburg and valley territories during the month of November. The large amount sold, 69,300 tons, in its extent is surprising to the trade in general, as it was not known through periodical reports of sales issued during the month, that any such volume of iron had been sold. The market, by the November sales, continues to display a strong absorbing power, through the steady buying of large steel interests, and without the support of the United States Steel Corporation, which up to this time has carefully refrained from any Bessemer buying at the ruling prices. Small purchases have not been conspicuous during the month, but steady specifications and a disposition of some melters to anticipate shipments, indicate that the less important buyers may be expected to come into the market again in the near future. Another significant feature of the month's buying is the fact that scarcely more than 20 per cent of the iron involved is for delivery after Jan. 1, and only a small tonnage after Feb. 1. The great bulk of the business done is for immediate shipment and most of the tonnage has already been delivered.

Another important sale of Bessemer iron made within the past week, not hitherto reported, is for 9,000 tons by a valley maker to the Republic Iron & Steel Co., for first quarter shipment at $19, furnace. This is in addition to the 9,000 tons reported sold to the same concern for the same delivery by the Bessemer association, making 18,000 tons for the first quarter by the Republic company this month. Other

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THE WEEK IN IRON CENTERS

PITTSBURG.

Buyers Striving to Take Out Full Allotments Before Jan. 1.

Office of THE IRON TRADE REVIEW,
510 Park Building, Nov. 30.

New records are still being made by the iron and steel industry. The offering of new business, while heavy, is scarcely as free, largely because present needs have been well satisfied by the active contracting movement of the past, yet the running volume of specifications against standing tonnage engagements is being maintained in a notable manner and in some lines it even continues to grow.

Sheets and tin plate have been among the leaders in the market and the aggregate of orders entered in November has greatly exceeded the mill output of that period. The full month tonnage of the American Sheet & Tin Plate Co. in November represents the largest total for a similar length of time in the company's history. While the regular movement of steel bars has been interfered with somewhat by the withdrawal of several independent interests from practically all new business and some decline in mill orders with these companies has resulted, large makers, who are booking new tonnage more freely report the past month's specifications will surpass those of October, the previous record month. Even where mill orders have dropped off moderately, these have not been sufficient to move up extended deliveries, so that there is no improvement on this score.

The presence on makers' books of many low priced contracts which will expire Jan. 1 is a factor of importance in the heavy ordering activity at this time, as buyers are bending efforts to take out their full allotments within the prescribed limit. For this reason, it is anticipated that specifications will continue to run at approximately the present gait until the year-end at least, in those lines where contracts to Jan. 1 were placed during the first and second quarters at what appears, today, extremely low prices.

Manufacturers of finished material continue to exert their efforts to care for the needs of their regular customers, but outsiders are having some trouble to get under cover since the spirit of discrimination in accepting offered business appears to have become more intensified. Makers are expressing themselves as believing they are conferring a favor upon rejected buyers under these conditions in that they can hold out no assurance of delivery of the desired material within any reasonable period.

Pig Iron.—The state of the pig iron market is one approaching dullness, for while there is some inquiry coming out, consumers appear convinced of the stationary character of conditions, and are in no hurry to close for their forward needs. The general quietness is giving rise to talk of the wavering of prices, but recent transactions in this territory are lacking to establish the degree of correctness of such views. The foundry iron situation undeniably has an easier tone.

Bessemer iron, which has been the most active, continues to display much strength at the $19, valley, level. The most recent sale of note is that closed in the week, of 10,000 tons to the Republic Iron & Steel Co., for first quarter delivery at $19, valley, the iron to be furnished by the Bessemer association. While a number of important transactions have been reported in November, it is understood that the total sales will exceed expectations, and that the final tonnage announcement will occasion some surprise. Basic iron shows little life, but the reports of some speculative iron pressing the market have been ill-advisedly associated with the large tonnage in private hands in this market, the presence of which has been frequently noted. It is understood that this iron is held for a high figure. A local steel company which has been inquiring for several thousand tons of steel-making iron, mostly basic for first quarter, is still negotiating.

The machine interest, which has been in the market for 2,250 tons of foundry iron, has not yet closed on the business. There are new cases to be noted where $17, furnace, for No. 2 has been quoted to equalize freights to distant points with that from furnaces located nearer the consumer's plant. A sale of 100 tons for December delivery under such conditions is noted. Some melters in Pittsburg and nearby territory have been interesting themselves in the buying of high phosphorus iron for mixtures, and this has led to some purchases of southern iron in this district, as previously reported. One western Pennsylvania consumer is now in the market for 800 tons of No. 2 southern for first quarter or first half shipment. Sanitary manufacturing companies have been buying some high phosphorus iron but that coming to local plants will be furnished by northern furnaces. A sale of 500 tons of this iron to one of these consumers is noted. Other inquiry from local buyers for plants in other territory is pending. On prompt and first quarter shipment on northern iron, we quote as follows:

Bessemer, valley	$ 19.00
Bessemer, Pittsburg	19.90
No. 2 foundry, Pittsburg	18.15 to 18.40
Gray forge, Pittsburg	17.40
Basic, valley	17.25 to 17.50
Basic, Pittsburg	18.15 to 18.40

Ferro-Alloys.—Current inquiry in ferro-alloys is not especially heavy, but there is a fair business going. Local foundry interests are still in the market for some tonnage of ferro-manganese for first half, and quotations down to $45, seaboard, have been made in some cases. The market is quite strong for last half and a number of sellers are asking higher than the quoted market. There has been some buying of 10 and 11 per cent ferro silicon by steel companies in this district during the past week, one interest taking about 250 tons for first quarter at the quoted prices. Some negotiations are still pending.

We quote ferro-manganese at from $45 to $45.50, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $45.50 to $46, Baltimore, or $46 to $46.50 for second half. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $62.50 to $63.50, Pittsburg; domestic 12 per cent, $26; 11 per cent, $25; 10 per cent, 24, Pittsburg, for prompt, with $1 advance for first quarter and $2 for first half. The foreign grades are held at advanced prices.

Plates.—Probably 30,000 tons of plates will be required for pending aqueduct and riveted pipe contracts in different sections. Among the principal work in sight is a line for Portland, Ore., which will require about 11,000 tons, and one for Portland, Me., about 6,000 tons, which are expected to be settled in January or February. The bidding on the Catskill aqueduct at New York, 6,300 tons, closes Dec. 2, and bids on the readvertised material for an extension of the Brooklyn waterworks will go in Dec. 3. The recent activity in car buying appears to be nearing an end, as most inquiries have been disposed of. The Clark Steel Co., Pittsburg, has been awarded 100 steel ore cars for the Lake Superior & Ispheming railroad, and these will be built by the Ralston Steel

Car Co. New business in plates is not so heavy, but specifications from the car companies and other principal consumers for contracts now on their books are continuing in undiminished volume. We quote present plate prices as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.55c to 1.60c. Extras are as follows, per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The buying movement in sheets for first quarter and first half shipment, which has been very active, is not so heavy, but specifications to the mills continue enormous. The tonnage entered on mill books by the American Sheet & Tin Plate Co. during November proved to be the largest of any month in the history of the company. In the way of new business, the interest of buyers now seems concerned largely with the special and highly finished grades of material, but makers are not inclined to encourage contracting in sheet lines requiring particular operations, since their main interest at present is in producing tonnage in the standard grades. The leading interest this week has in operation all its sheet capacity with the exception of one mill at Piqua and its Aetna-Standard works, or a total of 162 mills equivalent to 87 per cent. It is preparing to start some mills at its Aetna-Standard Works. We quote present sheet prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.70c; Nos. 9 and 10, 1.75c; Nos. 11 and 12, 1.80c; Nos. 13 and 14, 1.85c; Nos. 15 and 16, 1.95c; box annealed sheets, Nos. 10 and 12, 2.05c; Nos. 13 and 14, 2.10c; Nos. 15 and 16, 2.15c; Nos. 17 to 21, 2.20c; Nos. 22 to 24, 2.25c; Nos. 25 and 26, 2.30c; No. 27, 2.35c; No. 28, 2.40c; No. 29, 2.45c; No. 30, 2.55c; galvanized sheets, Nos. 12 to 14, 2.50c to 2.55c; Nos. 15 and 16, 2.60c to 2.65c; Nos. 17 to 21, 2.75c; Nos. 22 to 24, 2.90c; Nos. 25 and 26, 3.10c; No. 27, 3.30c; No. 28, 3.50c; No. 29, 3.60c; No. 30, 3.85c; painted roofing sheets, $1.70 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $3 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—The mills are receiving especially heavy specifications for this season from the buyers who have freely covered for their first quarter and first half needs. New business at present is less brisk, being represented largely by the inquiry for special material, but makers, owing to their being sold up so far ahead, are rather welcoming an opportunity to avoid booking much additional tonnage. The season's contracting by the salmon packers of the Pacific coast has been concluded, and specifications have been liberally given by these consumers for shipment after the first of the year. Tin plate prices are very firm and we quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60 f. o. b. mill, Pittsburg district.

Rails and Track Materials.—Some contracts for lots of 1,000 tons and less of standard sections are being taken by the local maker from traction and steam roads, but no important orders are reported. The demand for light rails is very good and the bookings of the Carnegie Steel Co. the past week were 2,750 tons. Considerable spike business is going at better prices and a contract made in the week calls for 4,000 kegs of both standard and small spikes. Specifications against spike contracts are free, but makers are not catching up much on accumulated business. We quote standard Bessemer rails as follows, the base price on open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $28, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.75c to 1.85c, Pittsburg; hand spikes, 1.80c to 1.90c, Pittsburg.

Steel.—With the mills having little steel to offer for early shipment and with indefiniteness as to prices still characterizing the forward market, the situation in semi-finished material continues very interesting. Consumers appear well covered for their immediate needs and many of them are in a comfortable position for their future requirements through long standing contracts, but there are a number of buyers, notably in sheet bars, who are waiting to take advantage of any material offered by makers. Consumers seem to realize the strong likelihood of a shortage in sheet bars for the first half and their inquiry has become quite insistent, but many of the mills are still declining to make prices. One user wanting 10,000 to 12,000 tons for first half sounded this market thoroughly the past week without results. Sales of forward bars at $30, mill, are reported, but some first quarter contracts have been made on a lower basis, notably one small mill, which has disposed of its tonnage up to April 1 through a conversion deal on a $28, mill, arrangement. Bessemer billets appear established at a $27.50, mill, minimum and sales of open-hearths for first quarter are reported at $28.50, mill. It is difficult to procure forging billets at any price.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.50 to $28, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $28 to $28.50, Pittsburg. Forging billets are held at $30 to $31, Pittsburg. Sheet and tin bars for prompt shipment are quoted at $28.50 to $29.50, Pittsburg.

Hoops and Bands.—In some of the lighter hoop products a condition almost similar to steel bars is existing, as the mills have taken on so much business that deliveries are several months behind. On the standard sizes, shipments are better, but these are also somewhat extended. Some large hoop buyers are now contracting for their forward requirement. Prices in hoops have stiffened and are strong. Heavy specifications are being received in bands and deliveries are far behind. We quote present prices as follows:

Hoops in carload lots, 1.55c to 1.60c; in less than carload lots, 1.65c to 1.70c; bands, 1.45c to 1.50c, base, with net extras as per standard steel.

Merchant Bars.—A general survey of the situation shows that steel bar specifications in November have reached fully as heavy a tonnage as in October, and this is rather remarkable owing to the enormous aggregate of the latter month. Many low priced contracts expire Jan. 1 and buyers are hastening to specify them in full. The mill orders in November with some of the large independent interests have been a little less in tonnage than last month, but this is attributed in a large measure to the position of these companies in practically withdrawing from the market on new business up to July 1, and thereby losing the tonnage that is frequently ordered with the

closing of a contract. With the principal interests which are more freely selling, however, November specifications have even exceeded the preceding month. There is no improvement in bar deliveries, which range from four to six months. Some local bar iron makers have again advanced their price $1 a ton to a minimum of 1.75c, Pittsburg, and some selling at higher figures is reported. Other large interests are, however, still quoting on a basis of 1.70c, Pittsburg. The bar iron situation in the west is weaker owing to the prevailing scrap conditions in those markets. The demand is good. Shafting continues active and discounts are well maintained. We quote the market as follows:

Common iron bars, 1.70c to 1.80c, Pittbsurg; Bessemer and open-hearth steel bars, 1.45c to 1.50c; plow and cultivator, 1.45c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.55c to 1.60c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Planished and machine straightened tire is 1.60c base; iron finished tire under 1½ by 1½ inches, 1.55c, both plus net extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c, plus net extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100-inch and thicker, we quote base prices for 100 pounds, $3.20 on hard, and $3.45 on soft, except in carload lots of one size where the price is lower.

Structural Material.—Building plans which are expected to be put through at the spring season are beginning to manifest themselves in the structural market. Considerable estimating by fabricators is under way and there are instances of prices being asked on work for delivery next May. Fabricating shops have adjusted themselves to the delayed deliveries on plain material, and some of them are not promising shipments in less than four months time. The minimum price on shapes remains 1.55c, Pittsburg, but this is scarcely an open one and on general business 1.60c is being quoted, while it is reported that even higher has been done by some independents. The Republic Iron & Steel Co. is in the market for 6,500 tons of material for new open-hearth and mill construction at Hazleton, O., near Youngstown, and is also asking for the material for an additional blast furnace. The American Bridge Co. has taken upwards of 2,000 tons for the buildings for new open-hearth furnaces and for a producer house for the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala. We quote present shape prices as follows:

Beams and channels, 15-inch and under, 1.55c to 1.60c; over 15 inches, 1.65c to 1.70c; zees, 1.55c to 1.60c; tees, 1.55c to 1.60c; angles, from 3 to 6 inches, 1.55c to 1.60c; over 6 inches, 1.55c to 1.70c; universal and sheared plates, 6¼ inches wide and wider, 1.55c to 1.60c.

Merchant Pipe.—Orders from the regular trade in merchant pipe are coming in steadily, but the market has no notable features. Makers are accepting specifications for December delivery, but continue conservative as to selling ahead. There have been some cases of covering of requirements after Jan. 1, but these have not been general, and have been with particular customers. There are a number of important undertakings in line pipe now in the preliminary stages which are expected to reach the market during later months. We quote the following official discounts on merchant pipe, subject to an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	71	53	65	..
⅜ inch	72	58	66	52
½ inch	75	63	69	57
¾ to 6 inch	79	69	73	63
7 to 12 inch	74	59	68	51
PLUGGED AND REAMED.				
1 to 4 inch	77	67	71	61
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	64	52	59	47
½ to 4 inch.....	71	59	56	54
4½ to 8 inch.....	67	55	62	50
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	60	49	55	44

Boiler Tubes.—While some makers who have booked heavily in locomotive tubes report their inability to make deliveries in less than 60 days, other mills have their capacities less engaged and can make shipments quite promptly. The tube market continues more active especially as to locomotive tubes, but conditions in the merchant market are also steadily strengthening. We quote the following official discounts on lap welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch.....	49
1¾ to 2¼ inch.....	61
2½ inch	63
2¾ to 5 inch	69
6 to 13 inch	60

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	43
1¾ to 2¼ inch.....	43
2½ inch	48
2¾ to 5 inch.....	55
6 to 13 inch.....	43

Wire Products.—There is more or less indefiniteness as to price policies being pursued by different wire makers, since the market hears conflicting reports of advances and even shading in nails in some districts. It appears well settled, however, that the ruling price on nails is $1.80 with expectations of an advance soon. Manufacturing wire is being sold generally through first quarter and in some cases first half at $1.70 or $2 per ton advance. There is a very fair specifying movement in nails and wire, but shipments can be made in from three to four weeks. We quote prices on nails for 60 days' shipment and on wire products for this year as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to dealers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—No sales during the past several weeks are reported, and the market is nominally quoted on Bessemer and open-hearth rods at $33 and $34, Pittsburg.

Coke.—Negotiations in furnace coke with some of the large buyers who have not yet covered for their first half requirements have progressed to the point where it is anticipated some important contracting will be done in the next several weeks. On the surface, the market is quiet, but there is a very strong undertone due to business in prospect. Some complaint is to be heard from consumers on the quality of spot coke which had been furnished them from certain quarters, and some large rejections have been necessitated. Shipments are moving better and the labor situation shows signs of improvement. New buying in foundry coke is rather light, but specifications against contracts are very liberal. We quote spot standard furnace coke at from $2.80 to $2.90, ovens, and on contract from $2.85 to $3, ovens. On first class Connellsville foundry coke we quote from $3.15 to $3.25, ovens, for prompt, and from $3.25 to $3.50, ovens, on contract. The *Courier's* figures for the week ending Nov. 20 show 35,021 ovens active with an output of 412,156 tons, compared with

35,268 active ovens and a production of 458,329 tons the previous week.

Old Material.—While there continues some irregularity in old material prices outside some of the leading grades, general sentiment on the selling side of the market is inclined to be firm. Where buyers are filled up for their needs and there still has been considerable of a grade to be had in the market, due to liberal speculation, some sagging of prices has resulted as in bundled sheet scrap and old car wheels, but, unless forced, holders are not willing to let go their material without a profit. Some profit taking is being done in moving from yards before the snow season those grades which represent financial advantages at today's market. The whole market shows little active demand from consumers, but on the leaders there are some filling-in contracts going at good prices. A sale this week of 1,000 tons of heavy steel at $18, delivered in December, is representative. Wrought scrap is firm, but cast seems easier. The embargo at Brackenridge, Pa., is still in force. The Pennsylvania lines west are offering about 3,000 tons, of which 2,100 tons are long rails, for closing Dec. 4. We quote gross tons delivered in the Pittsburg district, including Monesson, Sharon, Brackenridge, Follansbee and Steubenville, as follows:

Heavy melting scrap	$17.75 to 18.25
Rerolling rails	18.50 to 19.00
Bundled sheet scrap	15.75 to 16.25
Iron axles	27.00 to 27.50
Old iron rails	19.50 to 20.50
No. 1 wrought scrap	19.25 to 19.50
Old car wheels	17.00 to 17.50
Low phosphorus	21.50 to 22.50
Machine shop turnings	13.00 to 13.50
Cast borings	10.75 to 11.25
No. 1 cast scrap	17.00 to 17.50
Malleable	17.00 to 17.50
Stove plate	13.50 to 14.00

CHICAGO.

November a Very Dull Month for Pig Iron—Good Finished Tonnage.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Nov. 30.

The entire market is wholly lacking in unusual features. Pig iron makers are reducing their stocks very comfortably and manufacturers of finished products have only too much business to complain of. November business has been a close second to that of October, in the finished line, while with pig iron producers it has been about as poor as any month in the year, in amount of new sales, if, indeed, it does not carry off the banner in that respect. The amount of new finished tonnage booked by the leading interest here, during November, was a very little behind the banner month of October. Structural business is keeping up to the high mark set some months ago, and there is a good amount of business in sight, locally, which will be closed very shortly, while a heavy tonnage may be deferred for some months.

Pig Iron.—All reports are to the effect that conditions have undergone no change, in the pig iron market, the past week. Melters seem to be taking their purchases away from the furnace banks, with only an occasional request, here and there, for delayed shipment, and these requests are met, uniformly, with the demand that iron be moved within contract time. The result is that furnace stocks are being reduced in a satisfactory manner. Persistent pressure of re-sale iron, in the south, continues to exert an unfavorable influence on the market, and gives rise to many reports of price-shading below $14.50, Birmingham, some reports going so far as to name prices under $14.00. This probably has no foundation in fact, and may be brought to have an appearance of plausibility by juggling percentages and prices of analysis iron.

Lake Superior charcoal	$20.00 to 20.50
Northern foundry No. 2	19.00 to 19.50
Southern foundry No. 2	18.85 to 19.35
Southern silveries, 5 per cent silicon	19.90 to 20.40
Jackson Co. silveries, 8 per cent.	21.40
Malleable Bessemer	19.50 to 20.00
Alabama basic	19.35 to 19.85

Billets.—There is no change to report in this market, from previous conditions. Prices constitute a secondary consideration, the important question being that of securing the steel, which it is virtually impossible to do, in this territory.

Merchant Bars.—The very favorable conditions previously reported in this line continue to prevail. The demand for steel bars is very heavy, with scant available tonnage in sight; the situation as to supply is a little easier in regard to iron bars, for which there is a very good inquiry.

We quote, for Chicago delivery, as follows, with prevailing extras:

Bar iron, 1.60c to 1.65c; hard steel bars, re-rolled, 1.60c to 1.65c; soft steel bars and bands, and small shapes 1.68c to 1.78c base; hoops, 1.68c to 1.78c; planished or smooth finished tire steel, 1.88c to 1.93c; iron finish, up to 1½ x ½-inch, 1.83c, base, tire card; iron finish, 1½ x ½ inch and larger, 1.68c, base, bar card; channel for solid rubber tires, ¾ to 1 inch, 2.18c, flat, and 1⅛ inches and larger, 2.08c, flat; smooth finished machinery steel, 1 inch and larger, 2.43c; flat sleigh shoe, 1.73c; toe calk steel, 2.23c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel bars from local stocks, we quote, as follows: Bar iron, 2c to 2.10c, base; soft steel bars, 1.90c to 2c per 100 pounds base; soft steel hoops, 2.40c to 2.50c, full extras.

Plates.—A heavy tonnage in sales and also in specifications is reported from plate makers. There also continues to be a heavy call on the local stores for material. Prices remain unchanged.

We quote, Chicago delivery, as follows: Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.78c to 1.88c. For extras see Pittsburg report.

Store quotations are without change, as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2c to 2.10c; from 72 inches to 96 inches wide, 2.10c to 2.20c; 3/16 inch up to and including 60 inches wide, 2.10c to 2.20c; 72 inches, 2.35c to 2.45c; No. 8 up to 60 inches wide, 2.15c to 2.25c. Flange and head quality, 25c extra.

Sheets.—Both mill and store business continues excellent, and with the tendency to large expansion rather than otherwise. So far, there has been no movement toward higher prices.

For mill prices see Pittsburg report, freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.25c to 2.35c; No. 12, 2.30c to 2.40c; No. 14, 2.35c to 2.45c; No. 16, 2.45c to 2.55c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3.00c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.30c; galvanized sheets, Nos. 10 and 16, 3.20c to 3.30c; Nos. 18 and 20, 3.35c to 3.45c; Nos. 22 to 24, 3.50c to 3.60c; No. 26, 3.50c to 3.80c; No. 27, 3.90c to 4.00c; No. 28, 4.10c to 4.20c; No. 30, 4.50c to 4.60c.

Wire Products.—The same good conditions are reported as existing in this line, with general features unchanged. The advance in price which has been looked upon as a probability for some time, has not been announced, but may come at any time, as conditions seem to warrant it.

We quote, Chicago delivery, for the remainder of this year, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; with 30c for galvanizing; plain wire

to jobbers, carload lots, $1.78; staples, bright, $1.98.

Cast Iron Pipe.—There have been a number of small lettings of pipe contracts, and the total has been very satisfactory. St. Paul, Minn., had the largest letting, 2,000 tons, and it went to the American Cast Iron Pipe & Foundry Co., of Birmingham, Ala. Prices remain as they have been for some weeks.

We quote as follows: 4-inch water pipe, $28.50; 6 to 16 inches, $27.50; larger sizes, $26.50; gas pipe, $1 a ton higher.

Merchant Pipe.—The tonnage of mill orders is on about the same satisfactory level, and store business also continues very active. Price show no change.

For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛-inch to ¼-inch, 68 per cent; ⅜-inch, 69 per cent; ½-inch, 72 per cent; ¾-inch to 6-inch, 76 per cent; 7-inch to 12-inch, 71 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¾-inch to 5-inch, 60 to 62 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 48 to 50 per cent; seamless steel tubes, 2¾-inch to 4-inch, 47½ per cent.

Structural Material.—A few good-sized contracts have been placed, in the structural branch of the steel business, and a number are still unclosed. The demands on the mills from this source are increasingly insistent and deliveries are falling behind. Bids will be opened, this week, for the 550 tons of steel for the dome of the capitol at Little Rock, Ark., and the settlement of the 4,000 tons for additions to the Boston store, in this city, is awaited with much interest, as the bids have been in over half a month. Mandel Bros. have in view large additions to their retail stores in this city, and a decision on this matter will be reached soon. The American Bridge Co. took a contract for 1,700 tons to go into track elevation work now under construction in this city, and 250 tons for the Walker-Burton theater building at Minneapolis. The steel for the Hartley theater, at Duluth, goes to the St. Paul Foundry Co., instead of the American Bridge Co., as stated last week.

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.78c to 1.88c. For extras see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $2 to $2.10 per 100 pounds; angles over 6 inches, $2.10 to $2.20 per 100 pounds base; beams, 3 to 15 inches, inclusive, $2 per 100 pounds base; channels, 3 inches and larger, $2 per 100 pounds base.

Rails and Track Supplies. — The amount of business coming in to the mills from the railroads continues to be very heavy, the track fastenings business for November having been exceptionally large. Sales of heavy steel rails by the leading interest for the past week amounted to about 30,000 tons, practically all of which were Bessemer, and all went to western roads. One road which bought largely in the early part of the rail buying movement, took 20,000 tons additional.

See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60c a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet: angle bars, 1.50c to 1.60c; railroad spikes, 1.80c to 1.90c; smaller size spikes, 1.85c to 1.90c, base; track bolts with square nuts, 2.30c to 2.55c, base; with hexagon nuts, 2.45c to 2.70c.

Old Material.—The scrap market, after a slight further recession, seems to have become steadied, but there has been no large increase in the inquiry for old materials.

We quote, gross tons, as follows:

Old car wheels	$17.75 to 18.25
Old iron rails	19.50 to 20.50
Rerolling rails (4 ft. and over)	17.50 to 18.00
Old steel rails (2 ft. and under)	17.25 to 17.75
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	15.50 to 16.00
Heavy melting steel	15.25 to 15.75
Shoveling steel	14.75 to 15.25

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.50 to 15.00
No. 2 R. R. wrought	13.50 to 14.00
Arch bars and transoms	18.00 to 18.50
Knuckles, couplers and springs	14.25 to 14.75
Shafting	17.50 to 18.00
Iron car axles	21.00 to 21.50
Steel car axles	20.50 to 21.00
Locomotive tires	18.00 to 18.50
Dealers' forge	12.00 to 12.50
Pipes and flues	11.75 to 12.25
No. 1 cast, 150 lbs. and less	14.50 to 15.00
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.75 to 10.25
No. 1 boiler cut	11.25 to 11.75
Boiler punchings	16.00 to 16.50
Cast and mixed borings	6.75 to 7.25
Machine shop turnings	10.75 to 11.25
Railroad malleable	14.75 to 15.25
Agricultural malleable	12.75 to 13.25
Stove plate and light cast scrap	12.25 to 12.75
Angle bars, splices, etc. (iron)	17.50 to 18.00
Angle bars, steel	15.50 to 16.00

The Standard Steel Car Co. has granted a 10 per cent wage increase to the day men at Butler, Pa.

CLEVELAND.

Additional Buying of Spikes and Bar Iron—Pig Iron Dull.

Office of THE IRON TRADE REVIEW,
Browning Building, Nov. 30.

Iron Ore.—Vessel interests have concentrated their energy during the last week on bringing down as much ore as possible before the close of the season, and while there has been a continuance of informal discussion as to ore prices, no action has been taken. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—As far as prices are concerned, pig iron is standing very well the test of decreased buying. While there are perhaps two or three sellers willing to make concessions, these concessions do not seem to have attracted buyers, and most furnace interests believe that it would be wise to adhere firmly to prices, as they are confident that orders will be placed when necessity arises, at figures not below present maximum quotations. Foundries are, for the most part, taking their iron on contract very promptly, and in some cases are urging shipment more rapidly than it can be given by the furnaces. The market in Cleveland is dull. We quote for prompt delivery in Cleveland as follows:

No. 1 foundry	$ 18.75
No. 2 foundry	18.25
No. 3 foundry	17.75
No. 2 southern	18.85
Gray forge	17.40 to 17.65
Bessemer	19.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—There is some contracting in furnace coke for the first half of the year, and prices remain firm and unchanged on both furnace and foundry grades. On foundry coke we quote for first half delivery $3.25 to $3.50, and on prompt delivery, $3.15 to $3.25. We quote Connellsville furnace coke at $2.80 to $2.90 for prompt, and $2.85 to $3 for first half.

Finished Material. — There is no improvement in delivery on finished products, and some consumers are suffering on account of the lack of necessary material to carry on their operations satisfactorily. One buyer who came from a northern Ohio city on Tuesday to urge better delivery on contracts, reported that several interests would not promise better than from 20 to 23 weeks on small rounds, and from 12 to 16 weeks on

large rounds. Many of the smaller users of steel bars find it extremely difficult to obtain the necessary assortment of sizes. The American Car & Foundry Co. has contracted with a Cleveland interest for 1,000 tons of bar iron, and specifications against contracts recently made by other interests for this product are coming in promptly. The Lake Shore railroad has placed two additional orders for spikes, these being 6,000 kegs with the Republic Iron & Steel Co. and 5,000 kegs with the Jones & Laughlin Steel Co. Even at this early date, agricultural interests are sounding the market with a view of making contracts as soon as possible to cover their requirements after July 1, 1910. Jobbers are doing a very large business and November promises to equal, if not exceed, the high record of October. In some cases, local jobbers have not been able to meet the demand, and some sizes of structural material have been sold from a Chicago warehouse at 2.15c, delivered in Cleveland. Mills able to give prompt delivery on structural material are shipping from the east and selling in Cleveland territory at 1.79c, delivered.

Old Materials.—Conditions are the same as for the past several weeks, but dealers are not viewing the situation with a great deal of alarm. Consumers are playing a waiting game. Apparently there is no particular reason why this should be so, but large quantities of material on hand enable them to do so easily. In spite of the weakness of the market, prices have not been subject to a marked decline, and it is not probable that they will go appreciably lower, even though there may be no rise for several weeks. We quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$20.00 to 20.50
Old steel rails (under 6 feet)	17.50 to 18.00
Old car wheels	17.50 to 18.00
Old steel boiler plate	14.00 to 14.50
Malleable iron (railroad)	17.00 to 17.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	15.00 to 15.50
Heavy steel	16.25 to 16.75
Country mixed steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$17.00 to 17.50
No. 1 busheling	14.25 to 14.75
No. 1 machine cast	15.00 to 15.50
Axle turnings	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Grate bars	12.50 to 13.00
Pipes and flues	12.50 to 13.00
Tank iron	12.00 to 12.50
Sheet iron	7.00 to 7.50
Wrought drilling	11.00 to 11.50
Stove plate	12.50 to 13.00
Cast borings	9.00 to 9.50

At the recent annual meeting of the Alabama Consolidated Coal & Iron Co. in Jersey City, the retiring directors were re-elected.

NEW YORK.

Plain Material Prices Advance—Pig Iron Very Dull.

Office of THE IRON TRADE REVIEW, Room 1003, No. 90 West St., Nov. 30.

Iron Ore.—Trans-Atlantic freights continue within the range of 8s 6d to 9s 3d, and the movement is heavy. Cuban shipments have been seriously interfered with during the month by severe weather. No additional selling of importance is noted, as the trade is awaiting developments in connection with the 1910 prices on lake ores.

Pig Iron.—Extreme quiet prevails in the New York and New England pig iron market so far as new buying is concerned and, with most interests well sold through the first quarter and some through the first half no important activity is expected during the remaining weeks of 1909. From all points, however, reports are that deliveries are going forward at an unusually heavy rate, with an increasing number of requests for anticipated shipments. The strength of the situation lies in the fact that practically all branches of the consuming trade can see an enormous volume of business in certain prospect, assuring a tremendous activity at least over the next six or nine months. The continued decline in the British iron market has resulted in some further engagements, but the tonnage already definitely arranged for cannot be stated accurately until the mass of rumors now current can be sifted. The movement chiefly concerns the Philadelphia district. In spite of the relative inactivity of domestic irons, reports of weakness in the south and other centers finds no counterpart here, with the exception that basic iron is still available at somewhat under the asking price of $19.00, delivered. We quote, delivery at New York tidewater over the first quarter, as follows:

Northern foundry No. 1	$19.50 to 20.00
No. 2X foundry	19.00 to 19.50
No. 2 plain	18.50 to 19.00
No. 2 southern foundry	19.00 to 19.50
Malleable	20.00 to 20.50
Gray forge	17.75 to 18.25

Ferro-Alloys.—A limited tonnage of ferro-manganese inquiry is pending, but the recent heavy buying has not given the market the expected impetus and prices are in fact a shade lower, as $45 to $46, seaboard, can now be done over the entire year. One inquiry for delivery running up to May, 1911, is reported. Some little ferro-silicon business has been closed on a basis of $63, Pittsburg, for the domestic product.

Finished Materials.—With the exception of a number of small apartment and loft structures in the metropolitan district, the local market presents no important features, though every week serves to enlarge and make more certain the extremely heavy volume of steel work anticipated for this territory during the coming year. The Whitehall extension project, 10,000 tons, is on the verge of being closed; additional subway propositions are ripening; the call for tenders on the steel pipe required in connection with certain sections of the aqueduct gives some idea of the heavy tonnage of plates which that undertaking will eventually consume; it would not be surprising if the requirements of the Department of Docks and Ferries would run up to 20,000 or 25,000 tons, as work already mapped out for South Brooklyn and the lower North river will run close to that amount; and in many other lines the prospect is almost as bright. Outside of the New York, the tonnage involved in the approaches to the St. Louis bridge may run as large as that for the regular spans, and probably 25,000 tons will be needed for the Los Angeles aqueduct. The building program of the Steel Corporation will call for a great deal of structural work at Gary, Birmingham, Duluth, Cleveland and possibly other centers. New York City has mapped out a school construction plan which may use as much as 10,000 tons. Structural prices in the main show gradual improvement, with an occasional relapse explained by the desire to utilize plain materials before a low-priced contract expires.

In this city, the Radley Steel Construction Co. has taken four 8-story apartments on West 100th street, 800 tons, and a loft building at Twenty-eighth street and Madison avenue, 500 tons; the Metropolitan Bridge Co. has secured the Russell, Burdsall & Ward store building at Port Chester, 200 tons, a loft building on Sixth avenue, 550 tons, and a loft building for the Union Realty Co., Syracuse, 700 tons; the receivers of the Passaic Steel Co. will supply 350 tons for an apartment house on Seventy-ninth street near Amsterdam; the A. E. Norton Co. has booked an apartment at Ninety-third street and Riverside Drive; and the Hinkle Iron Co. has taken 150 tons for the St. Joseph's Home for the Aged. On all the foregoing, Bethlehem sections will be employed, as well as in the Sloane warehouse, already noted as going to Levering & Garrigues, 1,200 tons.

An early decision is anticipated on the long-pending Richmond, Va., via-

duct, for which 2,000 tons will be required. The Hackensack courthouse, 800 tons, is still pending. The Brooklyn Rapid Transit Co. has asked bids for reinforcing about a mile of elevated structure in Kings County, the Hudson & Manhattan is in the market for additional strucutral work, and other projects which have developed recently bring the total of railway bridge work under negotiation up to fully 10,000 tons, largely for the New Haven and one other eastern line. The American Bridge Co. will build four steel barges, requiring 400 tons, for the government. The Thompson Bridge Co., a local concern, will supply 700 tons for Pier 54 in San Francisco.

Plain material prices have improved to such an extent that quotations of 1.55c, Pittsburg, on shapes and plates and 1.45c on steel bars are now the minimum. Eastern plate mills are holding at 1.60c, Pittsburg, and this figure is also being obtained quite generally by eastern manufacturers of structural shapes, with 1.65c for early delivery. Billet prices for next year are still rather uneven, one interest having sold rather freely on a basis of $32.00, mill, for open-hearth rolling material. Bar iron prices range from 1.55c, eastern mill, to 1.60c. The Brooklyn Rapid Transit Co. is in the market for 1,500 tons of girder rails for next year's delivery. Inquiries are also pending for 2,000 tons of 35-pound rails for Central America and for 20,000 pairs of angle bars for export. We quote, New York delvery: Angles, 3 to 6 inches x ¼-inch and heavier, 1.71c to 1.81c; beams, 3 to 15 inches, 1.71c to 1.81c; tees, 3 x ¼-inch and heavier, 1.71c to 1.81c; plates, carload, tank, 1.71c to 1.81c; marine boiler, 2.06c to 2.16c; bar iron, 1.65c to 1.70c; soft steel bars, 1.61c to 1.66c; sheets, No. 28, black, 2.46c.

Cast Iron Pipe.—Interest is now centered on the second opening of bids on the 48-inch Brooklyn requirements, 15,000 tons of cast iron pipe or about 5.500 tons of riveted steel. The plate for the latter is 1/16 inch heavier than in the other large letting closed perhaps a year ago. Cast iron pipe makers are in the dark as to why the original bids were rejected and injunction proceedings may be brought to throw the matter over until after the change in administration. On Dec. 9 the city will open bids on close to 1,000 tons, principally 30-inch.

Old Materials.—The market shows no changes of importance from conditions reported a week ago. Rolling mill stock is possibly in somewhat lessened demand, with a resulting tendency toward more ample rejections. Heavy cast material is firm and the melting steel situation remains the same. We quote gross ton prices at **New York** tidewater as follows, these being the prices which local dealers are willing to pay.

Old steel rails (re-rolling)	17.00 to 17.50
Relaying rails	21.00 to 21.50
Old car wheels	15.00 to 15.50
Old iron car axles	22.00 to 23.00
Old steel car axles	20.00 to 20.50
Heavy melting steel	15.50 to 16.00
No. 1 railroad wrought	18.00 to 18.50
Iron track scrap	16.00 to 16.50
Wrought pipe	14.00 to 14.50
Cast borings	10.50 to 11.00
Wrought turnings	12.50 to 13.00
Heavy cast scrap	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Steve plate	11.50 to 12.00
Grate bars	12.00 to 12.50

CINCINNATI.

Not Enough Inquiry to Test The Market in Pig Iron.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Nov. 30.

Pig Iron.—The market has been almost featureless during the past week as buyers and sellers appear to be waiting for something to develop. While there is considerable speculative iron for prompt delivery pressing the market, prices do not appear to have been materially affected. Prompt shipment southern iron remains quotable at $14.50 Birmingham for No. 2 foundry and prompt shipment northern iron at $17.00 for No. 2 at furnace. It is trade talk that sellers are offering to take orders for prompt shipment southern at $14.50 and by special arrangement make deliveries during the early part of 1910, which has some tendency to disturb the quotable basis of $15.00, Birmingham, for first half of next year, which so far as the furnaces in the south are concerned seems to be maintained. Some malleable for first half delivery was sold during the week at $17.25 Ironton district, and $17.25 can be done for first half for No. 2 foundry; although the quotable basis remains at $17.50. There is not enough inquiry to really test the market at this time, and while the situation is apparently in the buyers' favor, the rate of consumption going on gives the furnaces confidence in the ultimate outcome of the market. The speculative holdings on which furnaces are insisting that shipping orders be furnished are difficult to place, as buyers are covered with contracts and getting deliveries on considerable cheap iron and this may have influence on spot prices in the near future, but during the past week the situation has been one of dullness and we hear of no sales reported below recent schedules. At the same time, it is said that consumers cannot be induced to make firm offers and have apparently decided to wait for market developments. We quote for prompt shipment and December delivery based on freight rates of $3.25 from Birmingham and $1.20 from Ironton delivered Cincinnati as follows:

Southern foundry No. 1	$18.25 to 18.75
Southern foundry No. 2	17.75 to 18.25
Southern foundry No. 3	17.25 to 17.75
Southern foundry No. 4	16.75 to 17.25
Southern No. 1 soft	18.25 to 18.75
Southern No. 2 soft	17.75 to 18.25
Southern gray forge	16.75 to 17.00
Northern No. 1 foundry	18.70 to 19.20
Northern No. 2 foundry	18.20 to 18.70
Northern No. 3 foundry	17.70 to 18.20
Jackson county 6 per cent silicon	19.20
Jackson county 8 per cent silicon	20.20
Jackson county 10 per cent silicon	21.20

Finished Material.—The market continues unchanged with purchasers calling for deliveries of steel on contracts and the mills showing no improvement in the matter of deliveries. It is anticipated that December specifications will tend to aggravate the situation, as a number of contracts expire with the year and consumers will be likely to specify up to the maximum estimated requirements mentioned in their contracts. Some of the large producers are refusing to take business for next year's delivery, as specifications now in hand and anticipated for December will carry the mills well into the early months of next year for all they can make. Jobbers are having an active demand from stock and find it difficult to keep a complete line of sizes. Carload prices are based on Pittsburg quotations.

Coke.—The market remains without material change, but a little furnace coke has sold below recently advanced prices. The general market, however, has not been disturbed and prices are unchanged. There is enough call for prompt shipment coke to absorb the offerings at current quotations. A few foundry contracts are under consideration for first half delivery. Prices in the leading coke producing districts are as follows:

	Prompt shipment.	Remainder of year.	First half 1910.
Connellsville district:			
Fdy. coke.	$3.25 to 3.40	$3.25 to 3.40	$3.25 to 3.50
Fur. coke.	2.85 to 3.00	2.85 to 3.00	2.90 to 3.10
Wise county district:			
Fdy. coke.	2.75 to 3.00	2.75 to 3.00	3.00 to 3.50
Fur. coke.	2.25 to 2.50	2.25 to 2.50	*Sliding [scale basis.
Pocahontas district:			
Fdy. coke.	3.00	3.00	2.75 to 3.00
Fur. coke.	2.75	2.75	2.75

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16⅔ per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Old Material.—The market remains dull with dealers finding it difficult to find an outlet for their holdings. Mills continue to hold off and are appar-

ently well supplied. Old material is accumulating to some extent in dealers' yards. Prices are not quotably changed, as there seems to be no efforts made to force scrap on a dull and lifeless market. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.50 to 14.00
No. 1 busheling, net tons	13.00 to 13.50
Old iron rails, gross tons	18.00 to 18.50
Old steel rails (re-rolling), gross tons	17.00 to 17.50
Old short lengths, gross tons	15.50 to 16.50
Old iron axles, net tons	19.00 to 19.50
Heavy melting scrap, gross tons	14.50 to 15.00
Stove plate net tons	10.50 to 11.00
Heavy turnings, net	9.25 to 9.75
Cast borings, net tons	8.00 to 8.50
Car wheels	15.50 to 16.00

PHILADELPHIA.

Some Good Sized Orders of Basic—New Building Projects.

Nov. 30.

Pig Iron.—Basic and low phosphorus iron have been the chief contributors to activity in the market during the past week, although a fair run of orders continues to drift in from the foundry trade in spite of its well-covered condition. Basic sales aggregate 25,000 tons, all taken by two neighboring furnace interests and made up of several blocks on which either first quarter, first half or second quarter delivery is specified. The price in all cases was $18.75, delivered. In addition an eastern plate interest has taken 8,000 for first half shipment from the interest about to start up at Chester, but it develops that this transaction was covered in a general way last week, though details were then lacking; the price was also $18.75. As a result of the selling movement just noted, consumers in this district are now well fixed for the first half, and a period of comparative inactivity is anticipated, though one interest is in the market for a fair tonnage of prompt iron. The disabled Heckscher furnace is again in blast, but will not produce basic until near the end of December. In low phosphorus iron we note sales of one 1,500-ton block and of another indefinite tonnage, which will probably amount to about 5,000 tons, besides some little British hematite. The price on domestic low phosphorus continues firm at $22, eastern Pennsylvania furnace, though sales on a lower basis are reported from the Pittsburg district. A neighboring pipe plant has closed on at least a part of its inquiry for No. 3 and gray forge. There has been considerable activity in foreign iron during the week, principally through the efforts of one importing interest to dispose of a 1,500-ton part cargo brought over on speculation. About half this tonnage, it is understood, has been sold to New England melters and the remainder is being offered locally at a shade above $17, seaboard. A leading pipe interest has received a large cargo of Middlesboro and another pipe maker in this district has taken on several small lots, but none of this iron figures in the market. Furnace interests report coke prices as decidedly easier, with some pressure to move spot coke, and are inclined to await developments. We quote, delivery at eastern Pennsylvania works over the first quarter, as follows:

No. 1X foundry	$19.50 to 20.00
No. 2X foundry	19.00 to 19.50
No. 2 plain	18.50 to 19.00
Standard gray forge	17.75 to 18.25
Basic	18.50 to 19.00
Low Phosphorus	22.50 to 23.50
No. 2 Birmingham	19.50 to 20.00
No. 2X Virginia	19.50 to 20.00
No. 2 plain Virginia	19.00 to 19.50

Finished Materials.—Bids will go in Dec. 10 on the substructure for the Vine street pier, a concrete proposition, using structural steel for reinforcing. About 750 tons are involved in the pending contract, but the entire pier will run about 3,000 tons. It is understood that the mill buildings required in connection with the Bethlehem Steel Co. additions will be fabricated by the McClintic-Marshall Construction Co. Eastern mills are now firmly established on a basis of 1.60c, Pittsburg, and are booking a satisfactory volume of business. The rail trade in the east is still light, leading to the report that the large mill now rolling billets for western delivery would be altered to roll structural shapes on the completion of the tonnage now on books, but it is learned there is no foundation for this report. We quote structural shapes and plates, Philadelphia delivery, at 1.70c to 1.75c; steel bars, 1.60c to 1.65c; iron bars, 1.65c to 1.70c; open-hearth rolling billets, $30.60 to $32.60.

Old Materials.—The market rules quiet, with some few price changes downward and the general situation rather easy, reflecting the important influence of the large import movement, particularly in heavy melting steel. Arrivals at this port during the week included a 3,000-ton part cargo of crop ends from England, 1,500 tons from St. Johns, N. F., and a 3,000-ton block from South America. No large sales are noted, and we quote, gross tons, delivery at eastern Pennsylvania consuming points, as follows:

Old steel rails (rerolling)	$19.00 to 19.50
No. 1 steel scrap	18.00 to 18.50
Old steel axles	24.00 to 24.50
Old iron axles	30.00 to 31.00
Old iron rails	21.00 to 22.00
Old car wheels	17.50 to 18.00
Choice scrap R. R. No. 1 wrought.	20.00 to 20.50
No. 1 yard scrap	18.00 to 18.50
Machinery scrap	17.50 to 18.00
Low phosphorus scrap	23.00 to 23.50
Wrought iron pipe	17.00 to 17.50
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	15.00 to 15.50
Axle turnings, heavy	16.50 to 17.00
Cast borings	12.50 to 13.00
Stove plate	14.25 to 14.75

BUFFALO.

Long Time Contract for Charcoal Iron by Leading Car Builder.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Nov. 30.

Pig Iron.—The most activity in the iron market is found in the sale of charcoal pig. The American Car & Foundry Co. has been negotiating for some time for a permanent supply of high grade charcoal pig iron. The rapid exhaustion of hard wood timber has caused many to realize that charcoal will become scarce within the next few years. Michigan, with its large but diminishing supply of maple timber, is now the chief producer of charcoal pig iron. Charles H. Schaeffer, Marquette, Mich., Fred Smith, Elk Rapids, and Frank B. Baird, Buffalo, N. Y., after selling their Boyne City furnace to the Berry syndicate, began the erection of a new plant at East Jordan, Mich. The furnace is now completed and will commence operation before Jan. 1. Last week the East Jordan Furnace Co. was organized, and a contract was made with the American Car & Foundry Co. by which it secured the entire product of the furnace for a long term of years.

The foundry grades are not particularly active at this point, the market experiencing a quiet period. Quotations are unchanged for this year, the market being represented by the following figures, f. o. b. Buffalo:

No. 1X foundry	$17.25 to 17.75
No. 2X foundry	16.75 to 17.25
No. 2 plain	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Gray forge	16.00 to 16.50
Malleable Bessemer	17.25 to 18.25
Basic	18.00 to 18.50
Charcoal	20.00 to 21.00

Finished Products. — The largest booking of sheet piling at this point since the notable contract for nearly 7,000 tons for the Black Rock harbor, at Buffalo, has just been made in the contract given by the Ontario Power Co. to the Jones & Laughlin Steel Co. and the Lackawanna Steel Co., for 2,000 tons for early deliveries, the work to be done this winter. The contract was so arranged that the Jones & Laughlin Steel Co. and the Lackawanna Steel Co. each will deliver 1,000 tons. The sheet piling will be used by the Ontario Power Co. in building a trench for the intake tunnel leading to the company's power plant at Niagara Falls, Ont.

Of the 500 tons of steel for the C. M. Warner building at Syracuse, the standard beams, 350 tons, will come from the Jones & Laughlin Steel Co., and the Bethlehem Steel Co. will furnish 150 tons of columns. Erection begins Feb. 1, 1910. Bids go in Dec. 1 for 300 tons for an extension to the Gleason works, Rochester, N. Y. About 500 tons of steel will be required in the project of the Ashworth & Odell Co., at Jamestown, N. Y., which will build worsted mills immediately in that city. A new hotel project at Utica, N. Y., in which the Bagg's Hotel Co., of Utica, is interested, calls for 780 tons. About 200 tons is being figured in a new brewery at Buffalo which will be erected by the Buffalo Brewing Co. Ground will be broken within a few days. Plans for the steel work will be out within a week.

Old Material.—There is little doing in this market. Prices, however, hold up as quoted. As nearly as can be ascertained, there is a standstill in the scrap market throughout the state. Steel interests are not asking for tonnage. The embargo is still effective among the big consumers against shipments of old material. We quote, f. o. b. Buffalo, gross tons, as follows:

Heavy melting steel	$16.50 to 17.00
No. 1 railroad wrought scrap	18.25 to 18.75
No. 1 railroad and machine cast scrap	16.50 to 17.00
Old steel axles	21.00 to 21.50
Iron axles	26.00 to 26.50
Car wheels	19.00 to 19.50
Railroad malleable scrap	17.00 to 17.50
Machine shop turnings	12.00 to 12.50
Cast iron borings	9.50 to 10.00
Low phosphorus steel scrap	21.00 to 22.00
Old iron rails	20.00 to 21.00
Tank iron	14.00 to 14.50
Sheet iron	9.00 to 9.50
Stove plate	14.00 to 14.50
Pipe and flues	14.00 to 14.50
Grate bars	13.00 to 13.50
Boiler plate	15.50 to 16.00

ST. LOUIS.

Pig Iron Sales Limited—Old Material Prices Softening.

Nov. 29.

Pig Iron.—About the only signs of activity in the pig iron market in the St. Louis territory are a few scattering orders for lots running from carloads to 100 tons. It is believed by buyers that this condition of affairs will prevail until after Christmas, if not until the first of January has passed. The furnaces are shipping on contracts in a very lively fashion, and in some directions the melt seems to be increasing, as the foundries have asked to have shipments anticipated on pig and coke as well. The price for No. 2 southern is $14.50 to $15, Birmingham, for deliveries over the remainder of the present year, and some buyers insist that $14.50 can be done for shipment over the first half of 1910. Reports are sometimes heard of $14 iron, but no actual business on that basis can be traced. Ohio No. 2 is firm at $17 to $17.50, Ironton, for shipment over the remainder of the year and the first quarter of 1910.

Our prices, delivered, to which the Birmingham freight of $3.75 has been added, follows:

No. 1 southern	$18.75 to 19.25
No. 2 southern	18.25 to 18.75
No. 3 southern	17.75 to 18.25
No. 4 southern	17.25 to 17.75

Coke.—The best Connellsville 72-hour foundry coke is offered at $3.25 to $3.50, ovens, for all deliveries. Some Connellsville foundry can be had at $3 for prompt shipment, but it is not of the best quality. Connellsville 48-hour furnace coke is selling at $2.65 to $3, ovens, on contract, the price depending upon the quality. Virginia 72-hour foundry grades are offered at $3 to $3.25, and Virginia furnace coke at $2.50 to $2.75—the lower price for prompt shipment and the higher one on contracts. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when the consignment is destined beyond St. Louis.

Old Material.—The market for scrap iron is extremely quiet, with a tendency toward softening of prices. Our quotations follow:

We quote, gross tons, as follows:

Old car wheels	$17.00 to 17.50
Old iron rails	19.00 to 20.00
Rerolling rails (4 ft. and over)	16.75 to 17.25
Old steel rails (2 ft. and under)	16.50 to 17.00
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	15.50 to 16.00
Heavy melting steel	15.50 to 16.00
Shoveling steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.75 to 15.25
No. 2 R. R. wrought	13.75 to 14.25
Arch bars and transoms	18.00 to 18.50
Knuckles, couplers and springs	15.00 to 15.50
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	19.00 to 20.00
Locomotive tires	18.00 to 18.50
No. 1 country wrought	12.25 to 12.75
Pipes and flues	12.00 to 12.25
No. 1 cast, 150 lbs. and less	14.00 to 14.50
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.75 to 10.25
No. 1 boiler cut	11.50 to 12.00
Boiler punchings	13.00 to 14.00
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	10.75 to 11.25
Railroad malleable	13.25 to 13.75
Agricultural malleable	11.50 to 12.00
Stove plate and light cast scrap	11.50 to 12.50
Angle bars, splices, etc. (iron)	17.25 to 17.75
Angle bars, steel	15.50 to 16.00

The new plant of the Deemer Steel Casting Co., New Castle, Del., which has been in process of construction for several months, now appears reasonably certain of making steel by the middle of December.

SEATTLE.

Heavy Buying Not Stopped by High Prices—Foreign Importations Extensive.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Nov. 26.

Rapid advances in the quotations of finished materials, together with increases somewhat less hasty and marked in the prices of pig iron, coke and crude materials have failed to stay the buying movement which was started some three weeks ago, when consumers on the Pacific coast finally became thoroughly aroused to an appreciation of the actual conditions prevailing in the iron and steel trade. Liberal orders continue to pour in at advanced prices. With one or two exceptions, the stocks of finished materials in the hands of local jobbers are not heavy and some uneasiness is expressed over delayed deliveries. The foreign market is looked upon as a source of relief from congested American mills, and Pacific coast orders of foreign iron and steel, particularly steel bars, I-beams and channels, are unusually heavy at present. It is closely estimated that from 15,000 to 20,000 tons of foreign stock will be landed at Pacific coast ports in the next few weeks.

Pig Iron.—Domestic iron has been driven practically out of the market. Importations from Europe are heavy and foundrymen are showing their confidence in the future by buying freely for extended spring and early summer delivery. Ships due to arrive previous to March, 1910, are practically sold out, not over 50 tons in any one cargo remaining unsold. Iron due to arrive in July shows a range of prices approximately $2 per ton higher than those prevailing for similar deliveries eight months ago, in spite of the $1.50 reduction in duty which has been granted in the meantime. We quote foreign iron in gross tons ex ship Puget sound or Columbia river and domestic, f. o. b. Pacific coast terminals, as follows:

No. 1, English Jarrow, spot	$24.00 to 24.50
No. 1, Chinese, Han Yang, spot	23.00 to 23.50
No. 1, English, Cleveland and Jarrow, to arrive Jan., limited quantity	24.00 to 24.50
Glengarnock, Scotch, to arrive June-July	24.50 to 25.00
No. 1 English, Jarrow, to arrive June-July	24.00
Southern No. 2, domestic	25.00 to 25.25

Coke.—Foundry stocks are light and considerable inquiry is coming in for No. 1 foundry coke for immediate consumption. Foreign brands are selling in good volume, but more interest is manifested in domestic production,

particularly Wilkison coke. We quote, net tons, as follows:

No. 1 Wilkison foundry coke, at mines.	$ 6.50
No. 1 Wilkison foundry coke at Seattle.	7.20
German syndicate coke, to arrive Jan...	10.50
Solvay process coke, carloads.....	14.50

Merchant Bars.—Bar iron and steel are showing more strength than they have at any time for the past two years. The constant differential of 20 cents per 100 pounds between soft steel and common iron is being strictly maintained at all Pacific coast points. Local rolling mills are operating at capacity; the Portland mill of the Pacific Hardware & Steel Co. is choked with business. Importations of foreign bars are heavy and will probably increase, due to the high price and delayed deliveries of domestic materials. We quote base prices per 100 pounds, f. o. b. Seattle, as follows: Common iron bars, $2.20; soft steel bars, $2.40; machinery steel, $2.80; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.80.

Sheets.—Business in sheets, both plain and galvanized, is unprecedented in volume. Prices of blue annealed sheets have risen 35 cents and galvanized sheets 45 cents per 100 pounds in the past 30 days. Stocks are low and in some sizes jobbers are out of stock. A new advanced price was declared effective in Puget sound territory Nov. 22. The increase in prices has not resulted in any decrease in the buying movement. We quote as follows, f. o. b. Seattle: Blue annealed sheets, No. 12, 3.30c; No. 14, 3.35c; No. 16, 3.45c; Nos. 22 to 24, 3.70c; No. 28, 4.05c. Galvanized sheets, Nos. 12 and 14, 4c; No. 16, 4.10c; Nos. 18 and 20, 4.40c; Nos. 22 and 24, 4.55c; No. 26, 4.75c; No. 28, 5.25c; No. 30, 5.85c.

Old Material.—The foundry demand is light and dealers are disposed to hold stocks in anticipation of future improved demand. Prices, consequently, are firm. The supply of saw mill scrap is increasing. We quote, net tons, f. o. b. Seattle, as follows:

Foundry scrap, No. 1 grade....	$19.00 to 20.00
Foundry scrap, No. 2 grade....	17.50 to 18.50
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Miscellaneous steel scrap	5.00 to 8.00

BIRMINGHAM, ALA.

Little Change in Pig Iron—Fair Coal And Coke Demand.

Birmingham, Ala., Nov. 29.

No developments in pig iron have been noted in the past week, which leads one to wonder if there is really any pig iron market at all. The market is simply exceedingly inactive; and a thorough canvass of the situation reveals the fact that, in the judgment of some, probably there is no weakness from the fact that there is no demand for iron at any price—and to force the metal on the market would be suicide to the producer. Furnace interests report very satisfactory movement of stock, and still hold to base price of $15 per ton at the furnace. The most important factor here in the handling of merchant iron positively states that his concern has not sold a ton of iron on a lower basis than $14.50 per ton at the furnace. We have heard of some few sales at $14 base, but have been unable to trace the seller.

Old Material.—Conditions attending the scrap market have not changed since last report. Dealers consider things exceptionally quiet, and attribute the fact to the lull in the pig iron market. There is practically no demand for cast and wrought scrap. Heavy steel holds up fairly well, and some lots have been sold the past week at what is considered an attractive price. One dealer also reports a sale of a carload of old car wheels at a price slightly above today's market. Following are prices quoted, per gross ton, f. o. b. cars, Birmingham:

Old iron axles	$20.00 to 20.50
Old iron rails	15.75 to 16.25
Old steel axles	17.25 to 18.25
No. 1 R. R. wrought.....	14.00 to 14.50
No. 2 R. R. wrought.....	12.00 to 12.50
Old steel rails	12.50 to 13.00
Dealers' mixed wrought	11.00 to 11.50
No. 1 machinery	12.50 to 13.00
No. 1 steel	13.00 to 13.50
Old standard car wheels	13.75 to 14.25
Light castings, stove plate.....	9.75 to 10.25
Cast borings	6.00 to 6.50

Coal and Coke.—Several large coal dealers were approached the past few days as to the condition of the market, and all reported that shipments have been good, as well as demand for new business. This has had a telling effect on the coke trade, which has been exceptionally active. The output at mines is only hampered by some shortage in car supply. The miners are feeling buoyant over the new wage scale that goes in effect on the first of the month—and apparently they are well satisfied with the present situation and future prospects. More miners are needed in the district, and some more are coming in.

BRITISH IRON MARKETS.

Pig Iron Conditions Appeared Better in Middle of Month.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 20.

Conditions are, if anything, a little better in the pig iron trade. For the first time for some months, Connal's stores have been decreased on two days this week, which testifies to considerable consumption. Generally speaking, the tendency of stocks is still in the upward direction, today's total standing at 349,910 tons. Prices have only varied 3d during the week. They still stand at 51s 2d ($12.52) for cash, with a slight upward tendency. A most hopeful tone prevails in the Cleveland district, owing to a growing belief that America will shortly be a buyer; but at present practically nothing is being done with America, except in the way of steel crop-ends and scrap. A rumor was current this week that an American order for 6,000 tons had been arranged, but of this there is no verification. Smelters are showing their confidence by putting more furnaces into operation.

In other districts, things are not quite so cheerful, such brands as Staffordshire, Derbyshire and Northampton all being slightly easier, and some heavy orders have been accepted at slightly lower rates. The same condition prevails in the Birmingham district, where a little stocking of iron is going on, and makers are contemplating stoppages of furnaces for several weeks during the Christmas holidays. The hematite department is rather stronger, for the reason that the steel trade is better than iron. In the department for raw material, the great firmness of coke strengthens the market.

Finished Material.—In the finished material department, reports are a little conflicting. The latest returns about employment in Sheffield show that 15,827 were at work at the local steel works, an increase of 391 on the month. The heavy steel branches in armament are having a good run, and makers of tramway material are fairly busy, but the foundries are decidedly quiet, and this has had an effect in slightly weakening prices. Business in finished iron is poor. In this line, the best department is that of galvanized sheets, which will again show up well in the November board of trade returns, but the effect of the association collapse is seen in keen price-cutting by those houses most favorably situated for cheap production. The tinplate trade in South Wales continues excellent. There is a good deal of Belgian business coming, and makers of finished iron report that the prices offered by Belgian makers are quite impossible in the Midland district.

For the second week in November 38 railroads report gross earnings increased 26.04 per cent compared with same period in 1908.

METAL MARKETS.

ST. LOUIS.

Nov. 29.

Lead and Zinc.—The highest price paid for zinc in the Missouri-Kansas-Oklahoma district last week was $55 a ton, with $52.50 as the strongest assay price for 60 per cent grades. The larger portion of the output was disposed of in carload lots at $50 to $52 basis for 60 per cent ores, with smaller lots bringing less. Lead ore was $7 a ton less than the best price of the year, and weak at $53 a ton. Quite a number of producers are holding their lead ores for higher figures. Much ore was sold last week for $50.

St. Louis spelter is firm at $6.25. Pig lead underwent little change last week, and was quoted Saturday at $4.27½.

Shipments of lead and zinc were heavy in the district last week, some difficulty having been experienced in the Webb City camp over transportation facilities. Zinc ore prices having remained virtually the same for a month, and the demand last week was about equal to that of the previous two weeks. Calamine sold at $30 basis for 40 per cent grades. Choice lots brought as high as $36 a ton.

CHICAGO.

Nov. 30.

New Metals.—Copper has been the only metal which has attracted any attention, and even that has not amounted to anything like excitement. The talk of a merger of the copper interests has not been so general. Within a day, the February option on copper will be in effect, and already there is some inquiry for delivery during that month. Spelter is quiet, and tin is strong, owing to a large demand for tin plate and a not too heavy supply of the metal. Higher prices for tin, before many weeks, are expected.

We quote as follows: Lake copper, carload lots, 14c to 14¼c; casting copper, 13¾c to 13⅞c; smaller lots, ¼c to ¾c higher. Spelter, 6.35c to 6.45c; lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $8.00 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 32¼c to 32½c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Beyond some slight variations in prices on a few lines, this market is absolutely without change.

We quote, dealers' selling prices, as follows: Copper wire, 13¼c; heavy copper, 13½c; light copper, 11½c; heavy red brass, 12½c; heavy yellow brass, 10½c; light brass, 7½c; No. 1 red brass borings, 10c; No. 1 yellow brass borings, 8c; brass clippings, 9½c; tea lead, 3.85c; lead scrap, 4¼c; zinc, 5c; tin pipe, 30c; tin foil, 26c; pewter, 21½c; electrotype plates, free from wood, 4¼c; electrotype dross, 3c; stereotype plates 5c; stereotype dross, 3½c; prime slab zinc dross, $78 per ton.

NEW YORK.

Nov. 30.

Copper.—The weaker tone noted a week ago, following the sharp advance brought about by speculative buying, has continued in a moderate way and quotations are now appreciably lower with the volume of buying again reduced to its old-time proportions. For the first two or three months of 1910 producers now appear to be fairly well sold up, but beyond that limit there is generous offering and prices on the metal exchange reflect the easy condition. At present Lake is available at 13½c to 13¾c; electrolytic at 13¼c to 13½c; casting at 13c to 13¼c.

Pig Tin.—Largely on the strength of the London market, the domestic price of tin has advanced rather smartly during the past week, but is again somewhat easier. After selling as high as 31½c, it has shaded off to 31c or 31¼c, New York.

Pig Lead.—With the nominal price of the leading producer continuing at 4.40c, the actual market has rounded up to that figure, which now fairly represents the level of current transactions.

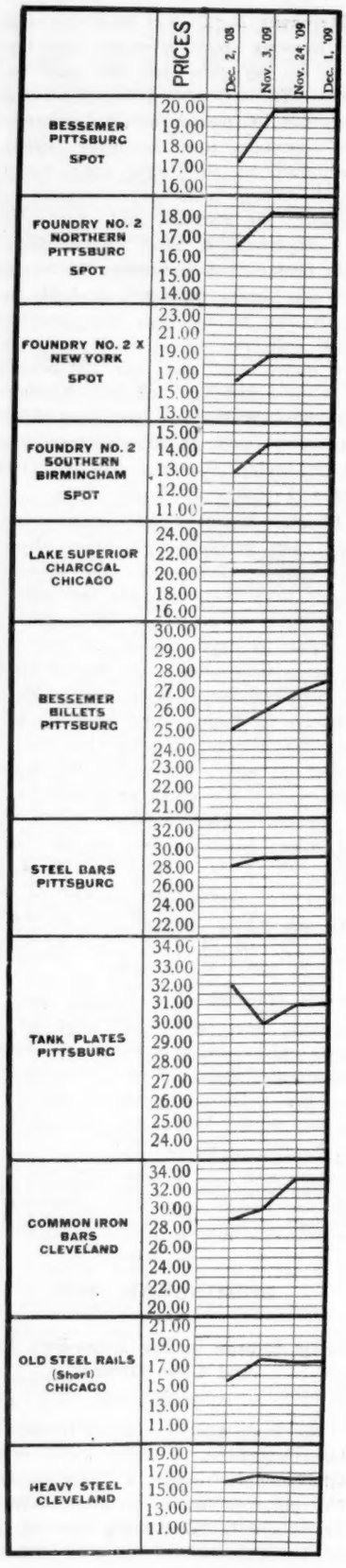
Spelter.—The market is thoroughly quiet, but the prices heretofore reported, 6.35c to 6.40c, are being fairly well maintained for New York delivery.

Antimony.—Cookson's, 8⅜c to 8½c; Hallett's, 8¼c to 8⅜c; ordinary brands, 7⅝c to 7⅞c.

Operations Started.—The Osterberg Tin Plate Co., Waynesburg, Pa., which recently took over the property of the Waynesburg Forge, Sheet & Tin Mills, has begun operations in the remodeled works. The plant consists of four hot and four cold mills and six tinning stacks of large size. The Waynesburg mill has been idle for about six years.

One hundred and fifty machinists and 30 apprentices have struck at the Spencer, N. C., shops of the Southern Railway Co., because of disagreement with the shop foreman.

PRICE CHART.



PRICES ANNOUNCED

On Port Henry, N. Y., Ores—One Million Tons Available.

New York, Dec. 1. (By Wire.)

Witherbee, Sherman & Co., Inc., announce the prices on Port Henry ore for 1910 as follows: Lump, $3.65; furnace, $3.15 per ton; Old Bed and Harmony concentrates, 6¼c per unit. All prices are at Mineville. About 1,000,000 tons will be available and this has been offered to customers on the basis of their present shipments. Dec. 20 is the limit for taking advantage of this allotment. These prices represent an average advance of about 40 cents per ton on most grades. Prices are considerably lower than in 1907.

ORE AND PIG IRON TRANSACTIONS AT PITTSBURG.

Pitsburg, Dec. 1. (By Wire.)

A local ore interest has sold 15,000 tons of standard non-Bessemer ore for prompt shipment at the market price.

It is understood that a machinery interest, which has been in the market for a block of foundry iron, has decided to postpone its purchase, and will likely take on a tonnage of scrap. Recent sales reported include 1,500 tons of No. 2 for prompt shipment at $17.25, valley; 1,000 tons of gray forge at $16.50, valley, and some malleable for immediate shipment at $17.25, valley. Sales of resale foundry iron at low prices are reported.

MANUFACTURERS' PUBLICITY ASSOCIATION ORGANIZED.

The Manufacturers' Publicity Association of Pittsburg is a new organization just launched by the publicity and advertising representatives of a number of the large industrial interests of that city. At a meeting held at the Fort Pitt hotel, Nov. 18, a constitution and set of by-laws were adopted and the following officers were elected: President, L. F. Hamilton, National Tube Co.; vice president, C. B. Nash, Standard Sanitary Mfg. Co.; secretary, C. W. Brooke, advertising engineer, Pittsburg; treasurer, Geo. E. Lees, American Vanadium Co. The chairmen of the committees are: Program, J. C. McQuiston, Westinghouse Electric & Mfg. Co.; publicity, W. A. Keirn, Mesta Machine Co.; membership, Colver Gordon, H. J. Heinz Co. The next meeting of the association will be held at the Fort Pitt hotel, Thursday evening, Dec. 9, and will be addressed by Mr. Nash on "House Organs, Their Possibilities and Limitations—With a Few Cautions." At the following meeting, Mr. McQuiston will open the discussion with a paper on "Copy." The present organization dates its inception from a series of weekly lunches which had been held for several months, and at which a number of the publicity representatives met for the discussion of matters of common interest and for the interchange of ideas. The association has undertaken the publication of a bulletin setting forth its various announcements.

WHITEHALL EXTENSION

Will be Erected by Brown-Ketcham With Lackawanna Sections.

New York, Dec. 1. (By wire.)

The structural steel required for the Whitehall building extension, about 10,000 tons, will be supplied by the Lackawanna Steel Co. and will be fabricated by the Brown-Ketcham Iron Works, probably at its Huff, Pa., plant.

The Carnegie Steel Co. reports rail sales of 29,000 tons, including 14,500 for the P. & L. E. The Illinois Steel Co. has sold a total of 9,500 tons.

EXTENSIVE IMPROVEMENTS PLANNED BY NEW YORK CENTRAL.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Nov. 30.

The New York Central railroad will spend a large sum in extending and improving its car shops at East Buffalo, which will make them among the largest and most complete in the world. A vast amount of equipment will be included. The company will spend $400,000 in this enterprise. The company has further announced the appropriation of $575,000 for grade crossing elimination along the Belt Line property at this point. Another appropriation, $100,000, will be spent in the purchase of real estate, allowing the extension of passenger facilities at Buffalo on Exchange street. In addition to this $1,250,000, $3,000,000 is also to be expended for betterments on the company's terminal line at Buffalo, changing grades and building a gravity freight yard at this point. About $1,000,000 will go toward double tracking the West Shore railroad to Albany.

Rumors of factory extensions still fill the air and one by one the firms interested announce they will soon send out specifications. Several of the projects at this point are notable. One of the latest authorized announcements was obtained from the Buffalo Foundry & Machine Co., a concern which has one of the largest foundry and machine shops in New York state.

TWO CONVEYOR COMPANIES CONSOLIDATE.

The Robins Conveying Belt Co., and the Robins New Conveyor Co., have been consolidated under one management. Thomas Robins, founder of the first named company, and at one time its president, becomes president of the combined companies, and the name of the first company will be used in the future. C. Kemble Baldwin will be chief engineer of the company, a position which he held with the Robins Conveying Belt Co., and when the Robins New Conveyor Co. was formed, two years ago, he severed his connection with the older company, and assumed similar duties with the new. The Chicago office will be located in the Old Colony building.

FINANCIAL NOTES.

New York, Dec. 1. (By wire.)

Money opened at 4¾ per cent as did the loaning rates on stocks, there being little demand. Sterling exchange opened from 487 to 487¾. The subtreasury gained $417,000 from the banks Tuesday, the net cash gain since Friday being $3,047,000. The rallying tendency noted at the close of yesterday's stock market was more pronounced at today's opening. The cotton market opened steady 2 to 5 points higher.

Copper exports for November amounted to 23,878 tons, compared with 19,146 tons in the corresponding period last year, an increase of 4,732 tons.

HEAVY SALES OF BESSEMER.

(Continued from first page.)

important sales of the month are 20,000 tons to the Jones & Laughlin Steel Co.; 10,000 tons to a steel interest, not previously reported; 10,000 tons by brokers to furnace interests; about 10,000 tons to apply on regular contracts and 10,000 tons to casting interests.

The average Bessemer price in November was $19, valley, or $19.90, Pittsburg. This compares with $18.78, valley, and $19.68, Pittsburg, in October. The average basic price in November was $17.31, valley, or $18.21, Pittsburg, compared with $16.94, valley, and $17.84, Pittsburg, in October. Selling was not heavy, the principal transaction involving 12,000 tons to the Pittsburg Steel Co., previously reported.

CLEVELAND EMPLOYERS TAKE FIRM STAND

Steps to be Taken to Apprehend Local Dynamiters and Sluggers—Effective Labor Bureau to be Established—Brazen Defiance of Law is Emphatically Denounced

An advanced stand for the open shop was taken by the Employers' Association of Cleveland, at the annual meeting and dinner in the Chamber of Commerce hall, Nov. 30. A decision was made to establish, as soon as possible, an employment bureau in Cleveland that will be used effectively on behalf of the independent working men of Cleveland and its vicinity in the next year. Further plans were laid for pursuing the gangs of sluggers and dynamiters who in the past two or three years have destroyed a large amount of property and threatened the lives of many in this city.

John Kirby Jr., president of the National Association of Manufacturers; James A. Emery, counsel for the National Council for Industrial Defense; and J. Philip Bird, general manager of the National Council, were among the speakers. Mr. Kirby explained that the reason for the existence of the National Association of Manufacturers is to secure a square deal between employers and employes. In a masterly manner, the speaker arraigned Gompers, Mitchell and Morrison, officers of the American Federation of Labor, recently convicted of violation of the anti-boycott law. In vigorous language he pilloried the three for their defiant attitude before the Toronto convention. He denounced their declarations, especially that of Mitchell, who declared that even after being released from jail punishment for still further defiance of the law, he will yet continue to employ the boycott, and to advocate its maintenance in public and private. Mr. Kirby said:

Isn't it about time that men tell the truth about these so-called leaders and their followers without fear of being called 'rabid and radical?' Isn't it about time for the Civic Federation to divorce itself from such an unholy alliance? Hasn't the time arrived when it should throw off this deception—come out into the open and either shut up shop, or put in a new honest and patriotic management? Hasn't the American Federation of Labor controlled its affairs long enough? The conduct of these so-called labor leaders is more dangerous to the welfare and perpetuity of this government than were the acts of the Haymarket anarchists in 1886, and the sooner they are placed behind the bars, the better it will be for this country.

This country has just passed through, or partially through, a temporary reign of the blatherskite—the era of sensationalism. It has not yet finished its course, but it may be said that the great masses of the people are beginning to get their second wind and are employing their sober second thought. But even yet, there are dangers ahead to be faced.

Mr. Emery spoke emphatically against any proposed amendment of the Sherman anti-trust Law, declaring that it is the one protection alike to manufacturer and shipper, a law that has stood the test of the highest court many times. He declared especially against the proposition to remove its application to labor organizations, holding that if the range of the law be narrowed, the chief sufferers will be the manufacturers and employers of labor.

Mr. Bird explained the methods pursued by the National Council for Industrial Defense, and very strongly endorsed the movement aiming to establish an effective employment bureau in Cleveland in the near future. With such a bureau, he pointed out, it will be possible to keep records of working men to the end that a higher standard may be maintained among the workmen with whom it came in contact.

President Walter D. Sayle, in his annual address, pointed out that steps must be taken definitely to bring to justice the gangs of dynamiters who had been operating practically unmolested in Cleveland for three years. President Sayle further charged that the small manufacturers of the city are being made victims of systems of graft that only an effective employers' organization may be able to defeat. Reports by the secretary, Phillip Frankel; the treasurer, O. M. Stafford; and the legal counsel, Attorney J. P. Dawley, showed that the affairs of the Cleveland association are in excellent shape, while the reports of the publicity committee, through Chairman Frank H. Clark, and of the labor bureau committee, through Chairman C. O. Bassett, demonstrated that effective work had been accomplished during the past year and gave hints as to what was expected to be accomplished in the new year.

Resolutions were adopted providing for the continued publication of *Facts* the official organ of the Association; for the actual establishment of an adequate employment bureau in Cleveland; congratulating the United States Steel Corporation upon the success attained in establishing the open shop in its plants; and an emphatic demand that the Cleveland chief of police devote attention to apprehending those who have been dynamiting structural jobs in this city.

These officers were elected: President, Walter D. Sayle; first vice president, W. B. McAllister; second vice president, Richard A. Feiss; treasurer, O. M. Stafford. Governing board—General delegates (representing the membership-at-large): George F. Thesmacher, W. S. Blau, Joseph H. Glauber, John A. Penton, J. H. Van Dorn, Charles Kurtz, N. S. Calhoun, Frank H. Clark, Charles A. Nicola. Governing board—Association delegates (representing affiliated organizations): C. O. Bassett, William B. Greene, William G. Hoffman, L. H. Kittredge, C. P. Lainінger, Sol Salberg, J. P. Smith, W. W. Toot, C. T. Williams, William T. Morrison.

WILL BUILD OPEN-HEARTH PLANT AT NILES.

The Basic Steel Co., Niles, O., has recently announced its intention to erect a basic open-hearth steel plant at Niles. The plant will have a capacity of over 500 tons per day and will be built at an estimated cost of $500,000. The new plant will be erected on a site adjoining that of the DeForest Sheet & Tin Plate Co.'s plant which was placed in operation about a month ago. The two companies were incorporated at the same time and have the same stockholders.

The officers of the Basic company are as follows: Wade A. Taylor, president and treasurer; Charles S. Thomas, vice president and secretary; H. M. Stevens, W. A. Hutchings, W. R. Thomas, G. P. Gillmer, C. S. Thomas, D. A. Strickland and Wade A. Taylor, directors.

The announcement is made that the Electro-Steel Co. will build just an experimental plant at Welland, Ont., this fall, the building being 75 by 150. The construction of this building has been commenced. If the experiments prove satisfactory, it is expected that ultimately larger construction projects will be planned.

TREMENDOUS IRON AND STEEL PRODUCTION OF ALLEGHENY COUNTY.

The overshadowing importance of Allegheny county in the tremendous extent of the iron and steel industry of the state of Pennsylvania is fitly illustrated in the annual report for the year 1908 issued by John L. Rockey, chief of the state bureau of industrial statistics, which deals with various phases of the business. Of the total pig iron production of the state during the year, 56.18 per cent represents the output of the blast furnaces of Allegheny county and of the crude steel made, 53.44 per cent came from the plants located within that territory.

The comparative statement of pig iron made in the state at large and in Allegheny county is as follows:

State of Pennsylvania.....6,973,621 tons
Allegheny County .....3,917,924 tons

Outside Allegheny County .3 055,697 tons.

The comparative statistics on steel production follow:

State of Pennsylvania .....7,378,210 tons
Allegheny County .....3,943,524 tons

Outside Allegheny County..3,434,686 tons

In pig iron, Allegheny county is followed in importance with Lawrence county with 543,874 tons or 7.79 per cent, Mercer county with 406,320 tons or 5.82 per cent and by Cambria county 369,543 tons or 5.3 per cent. Cambria county next to Allegheny, is the heaviest producer of steel with 525,637 tons or 7.12 per cent, followed by Lawrence county with 500,000 tons or 6.77 per cent and Mercer county with 431,305 tons or 5.84 per cent.

The effect of the business depression is clearly shown by the statistics. The production of pig iron was 4,338,364 gross tons less than in 1907 and in steel, 4,982,915 gross tons less than the preceding year. The value of the product in iron was $110,987,346 which was a reduction of $95,455,809 from 1907 and the number of employes was 5,996 less and the wages paid $5,407,966 less. The steel produced was valued at $273,608,969, the number of persons employed was 92,049 which was 45,663 less than in 1907 and the wages paid $51,974,293, a falling off of $39,439,091. The investment in pig iron making was $191,397,048; in steel works finishing their own output it was $321,545,176. Companies without finishing mills had a capital of $20,851,951.

In commenting upon the trend of development in operations, Chief Rockey says: "An analysis of the steel production shows that Bessemer steel which in years gone by was the principal steel ingot and casting production, is being supplanted rapidly by open hearth steel."

COLONIAL STEEL CO. OFFICERS.

J. B. Finley has been elected president of the Colonial Steel Co., Pittsburg, succeeding the late James W. Brown. Other officers were elected at the regular monthly meeting of the board of directors as follows:—Vice president, W. H. Nimick; secretary, Charles M. Brown; treasurer, T. H. Childs. The executive committee is composed of J. B. Finley, W. H. Nimick, president Keytone National Bank, Pittsburg; J. B. Marsh, president of the Standard Underground Cable Co., Pittsburg; C. A. Painter, Scully, Painter & Beech, Pittsburg, and Frank B. Nimick. The business of the company has grown largely in the past few months. The output of crucible steel has been greatly increased and the open-hearth department is running to full capacity.

PROVIDING ORE FOR SPRING VALLEY FURNACE.

The Cady Creek mines in Wisconsin are in active operation and it is expected that enough iron ore will be taken out to insure operation of the Spring Valley blast furnace for at least two years. The stack was blown in on Nov. 6 after a shutdown of almost two years. The mines were opened some time ago and enough ore was on hand on Nov. 1 to run the furnace until next summer at least. The owners are pushing the mines, however, in anticipation of favorable conditions for a much longer time.

DIAMOND STATE STEEL ASSETS.

The manner in which the $138,000 remaining assets of the Diamond State Steel Co. had been apportioned by Wm. G. Mahaffy, as special master, has been sustained by Judge Bradford at Wilmington. Certain creditors holding collateral had received the full amount of their claims, and exceptions to this manner of distribution had been taken by other creditors, among them the Henry A. Hitner's Sons Co., which received but a part of its claims.

The Virginia Iron, Coal & Coke Co. is repairing its Graham, Va., stack preparatory to relighting it probably about Jan. 1.

STEEL WORKS

Will be Built Near San Francisco—Contracts for New Buildings.

San Francisco, Nov. 26.

The Columbia Steel Works has acquired 20 acres of land at Black Diamond, 50 miles from San Francisco by rail or 55 miles by river steamer, and has started work, breaking ground for its plant to be erected on the site. The land was purchased from the Rancho Los Medanos, and the site of the new plant is directly east of the Bowers Rubber factory, and in the Black Diamond coal belt. The plant will employ fully 400 persons. It is owned by the Columbia Steel Co., which was recently incorporated in Nevada with a capital of $500,000. The following are the incorporators: C. A. Hooper, C. M. Gunn, C. S. Cole, C. G. Dall, Sumner Crosby, W. A. Creed, A. M. Kidd.

San Francisco, though practically rebuilt, continues a large user of structural steel. The following is a fair example of orders placed with some local fabricators. The Pacific Rolling Mill Co., of this city, has contracts on hand requiring 5,850 tons of structural steel for buildings now in course of construction. Of that amount, 5,700 tons are required for buildings in San Francisco, and 150 tons for a building in Eureka. The following are the buildings and the amounts of structural steel required by each: City hospital of San Francisco, 3,500; Mission Savings Bank, 250; Anglo and London Paris National Bank, 250; Heynemann building, 500; Daniel Roth building, 200; City Corporation Yard building, 600; St. Francis Hotel Annex, 400; Eureka Post Office building, 150 tons.

A Correction.—In THE IRON TRADE REVIEW of Nov. 25, was published a telegram from Birmingham which was made to read "Furnace companies are now quoting $14.50." The telegram, as written by our Birmingham correspondent, and as transmitted, read "Furnace companies are not quoting $14.50." The error was made by the printer and we desire to call attention to it, because all quotations below $15, which we have been able to substantiate, have been traced to middlemen. The furnaces are adhering to $15.

Exports of copper from New York for the week ending Nov. 25 were 4,794 tons, and since Nov. 1, were 19,691 tons compared with 17,045 tons last year.

LITTLE IRON ORE

Will Be Moved Under Excess Insurance Rate on Lake Vessels.

Ore shipments for November have not yet been compiled, but operators believe the movement will approximate 5,000,000 tons, as Lake Erie docks have handled the normal quantity during the month. The regular insurance expires on Sunday and little business will be done after that date. The leading companies are now laying up their vessels. The Pittsburg Steamship Co. has not sent a vessel up since last Saturday and the Cleveland-Cliffs Iron Co. is putting its steamers into ordinary as they come down. The insurance companies have extended insurance for three days or until Dec. 8, at an excess charge of 1 per cent. This means about $3,800 to the ship, so that carrying charges would have to be stiffly advanced to cover the excess cost. No arrangements have as yet been made for the extension of insurance from Dec. 8 to 10, but it is clear whatever freight is moved between those dates will be at a very fancy figure. Practically no ore will be moved under the excess insurance rate, but some coal probably will be.

Coal shipments are now being rushed both to Lake Superior and Lake Michigan ports, 60 cents being paid to the head of the lakes and 50 cents to Lake Michigan. A large grain fleet will leave the head of the lakes on Saturday or Sunday and that may be said to be the real wind-up of the season.

SATISFACTORY DEVELOPMENT OF NEWFOUNDLAND ORE DEPOSITS.

The Nova Scotia Steel & Coal Co. advises that further development work shows its submarine ore bodies at Wabana, Newfoundland, to increase in thickness as the bed is explored seaward. At a point somewhat more than 1,200 feet beyond the boundary line between its own submarine areas and those of the Dominion company, a diamond drill hole was recently put down. This cut through the four important seams of ore referred to in the article published in THE IRON TRADE REVIEW for Oct. 14, 1909, describing these workings and showed them to maintain their thickness. The Lower Bed, which is represented by the so-called Dominion bed on the land, was found to be 32 feet in thickness. Average analyses taken every foot in depth in this latter bed showed the ore to run practically 50 per cent, with a considerable portion as high as 54 per cent. This makes it clear that, so far as the main bed is concerned, there is a gradual widening of the seam from its outcrop seaward.

GROWING POPULARITY OF THE DUPLEX PROCESS.

Announcement is made that the Bethlehem Steel Co. will employ the duplex process in connection with the new construction program recently announced for its plant at South Bethlehem. The additional steel capacity will be secured by the installation of a 400-ton mixer and two 20-ton Bessemer converters. The hot metal from the blast furnaces will be partly desiliconized and decarburized in the Bessemers and then will pass to the present open-hearth furnaces, thereby practically doubling their output without constructing other open-hearth capacity. This decision is in line with the general trend of steel-making practice in the East, where several large plants are either already operating by the duplex process or are arranging to employ it. The increasing tendency to introduce the process is discussed editorially in this issue.

MAKING PROGRESS AT GARY.

The new merchant mills which the Indiana Steel Co. is building at Gary, are making very satisfactory progress toward completion. It is expected that by Dec. 7, it will be possible to roll bars experimentally, on the 18-inch mill. The 14-inch mill will not be ready for six weeks or two months, while the 10-inch and 12-inch mills will be considerably later. No. 7 blast furnace will blow in, according to present expectations, in about a week. No. 8 was blown in on November 20. With the blowing in of No. 7, the company will have six of its eight Gary furnaces in operation.

LONDON MARKET OPENING.

London, Dec. 1. (By cable.)

Copper opened at a decline of 10s in both spot and futures, the market being weak; spot being quoted at £58 2s 6d, and futures at £59 5s. Pig tin opened strong, spot being up £1 to £143 15s, and futures also up 17s 6d to £145 10s. Pig lead was steady and unchanged at £13.

PERSONAL.

George Ormrod, president of the Donaldson Iron Co., Emaus, Pa., has been seriously ill of late, but is now considerably improved in health.

Will Phibbs, who has been superintendent of Mattie furnace, Girard, O., has accepted an appointment by the Northwestern Iron Co., at Mayville, Wis.

Samuel Mather, Cleveland, is a member of the committee appointed by the National Civic Federation to investigate the cause of mine accidents.

Peter Donaldson, of James Watson & Co., Glasgow, is in this country. During the past week he has been in Ohio, where he has extensive coal interests.

M. R. Gano has been admitted as a member of the firm of I. K. Dimmick & Co., Land Title bldg., Philadelphia, heretofore composed of J. K. Dimmick and H. W. Coleman.

W. A. Chadwick, formerly with the Sharon, Pa., plants of the American Steel & Wire Co., has succeeded P. A. Paff in charge of the Sterling, Ill., mills of the Griswold Wire Co.

A. H. Reed has resigned as engineer with the Independent Phosphate Co., Columbia, Tenn., to accept the position of local manager of Rosiclare Fluor Spar & Lead Mines, Rosiclare, Ill.

Frank L. Alcott, for 27 years identified with the construction department of the C., M. & St. Paul railroad in Milwaukee, has resigned to take a position witth the Buckeye Steel Casting Co., at Columbus O.

I. H. Denton, formerly secretary of the Cleveland Tool & Supply Co., has been engaged by the Ohio Seamless Tube Co., Shelby, O., to take care of its interests in Cleveland, Detroit and adjacent territory, with offices in the Williamson building, Cleveland.

R. H. Rehm, who was formerly connected with the Franklin Iron Mfg. Co. at its Franklin furnace, Clinton, N. Y., has now become associated with Nash, Isham & Co., New York, and will represent them on the road, traveling through the New England States.

W. G. Lottes, instructor in forge practice at the college of engineering, University of Wisconsin, for 17 years, has been granted one year's leave of absence. He will spend the time as special inspector of steel for the International Harvester Co., visiting its various plants in the United States and Canada.

OBITUARY.

Robert M. Van Arsdale, proprietor of the *American Engineer and Railroad Journal* and a member of the American Trade Press Association, died at his home in New York City, Nov. 23.

Standard Oil Decision Bends Market

In the early transactions Monday, violent declines occurred, especially in Amalgamated Copper and Steel common, and the rest of the list was weak; Standard Oil stock declined $50 a share and closed at the lowest. On the supposition that the Standard Oil decision would prevent the completion of the proposed copper merger, copper stocks broke violently Tuesday; Crucible Steel preferred advanced to the highest price in more than six years. Wednesday's market was active and irregular, iron and steel issues closing lower; the New York Central announced that stockholders are given the right to subscribe for new stock at 25 per cent of their present holdings; Crucible Steel preferred advanced to a new high price. The American exchanges were closed Thursday because of the Thanksgiving holiday; the Bank of England rate of discount remained unchanged at 5 per cent; foreign stock markets were firmer and slightly higher. The New York market was firm and higher Friday, Steel common and copper stocks leading in the advance; Crucible Steel preferred again advanced to the highest price ever quoted. On Saturday, a violent break in the copper stocks weakened the general list, and prices closed lower all around.

Call money reached 5 per cent several times during the week, on Wednesday being 2½ per cent, and later rising. Time money was in fair demand, with no advance in rates. Exports of gold for the week were $4,839,200, of which amount $4,450,000 went to South America; since Jan. 1 the exports of gold have been $84,368,717, compared with $48,579,984 the same period last year. The weekly bank statement was somewhat better than estimated; the surplus increased $1,500,000, so that the total surplus now stands at $11,753,500. The actual condition of clearing house banks was as follows: Loans decreased $12.055,900; deposits decreased $15,455,600; reserve decreased $2,424,300; surplus increased $1,439,625; and the ratio of reserve was 26.00 per cent, compared with 25.87 per cent the previous week. Non-member banks and trust companies reported the following actual figures: Loans decreased, $9,644,000; net deposits decreased, $15,424,400; reserve decreased, $738,500, and the percentage of reserve was 16.7, a decrease of 0.2.

Commercial failures for the week were 228, compared with 239 the preceding week, and 204 the corresponding week last year. Bank clearings for the week showed a decrease compared with last week, but an increase of 11 per cent over last year. Shares were sold to the number of 4,926,000, compared with 3,617,700 the preceding week, and 3,924,000 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $16,909,000, compared with $19,702,000 the preceding week, and $26,354,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Nov. 27	Changes in week	Date 1909 Ann. M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Date Last Div. Pay.
Allis-Chalmers	15½	— ⅛	Sept. 2	$19,820,000		.....	.....
Allis-Chalmers, pr	55¼	— ¾		16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	14½	.....	Feb. 2	41,233,300		.....	.....
American Can, pr	84¾	+1		41,233,300	7 cum.	1¾ Q.	Oct., 1909
Am. Car & Fdy	73	—1	June 24	30,000,000		½ Q.	Oct., 1909
Am. Car & Fdy., pr	120	+ ½		30,000,000	7 n. c.	1¾ Q.	Oct., 1909
American Loc	60¾	— ¾	Oct. 19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	114	—1¼		25,000,000	7 cum.	1¾ Q.	Oct., 1909
American Ship	67⅜	.....	Oct. 13	7,600,000	4	1 Q.	Oct., 1908
American Ship, pr	110¾	.....		7,900,000	7 cum.	1¾ Q.	Sept., 1909
Am. Steel Foundries(new)	64⅞	— ¾	Dec. 2	17,184,000		1¾ Q.	.....
Barney & Smith	40	.....	June 1	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr	105	.....		2,500,000	8 cum.	1 Q.	June, 1908
Bethlehem Steel	35	.....	April 6	14.862,000		.....	.....
Bethlehem Steel, pr	68	.....		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	47	— ¼	Mar. 16	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	46½	.....		8,468,000*	4	2 S. A.	Sept., 1909
Chicago Pneumatic Tool	38	— ¾	Feb. 15	6,145,000	4	2 S. A.	Oct., 1907
Colorado Fuel	49	—2	Oct. 18	34,235,500		1¾ Q.	April, 1902
Crucible Steel	14¾	+ ⅜	Oct. 20	24,578,400		3½	.....
Crucible Steel, pr	89	+5⅝		24,436,000	7 cum.	1½ Q.	Sept., 1909
Empire Steel	12	.....	April 27	1,254,770		.....	.....
Empire Steel, pr	73	+1		2,500,000	6 cum.	3 S. A.	July, 1909
Fay & Egan	90	.....	Feb. 18	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr	110	.....		1,000,000	7 cum.	1¾ Q.	Nov., 1909
General Electric	161	—2½	May 11	65,179,600	8	2 Q.	Jan., 1910
Harbison-Walker	40	+5	Jan. 18	18.000.000		2 Q.	Oct., 1907
Harbison-Walker, pr	95	.....		9.600.000	6 cum.	1½	Oct., 1909
International Pump	50⅜	—1⅜	June 8	17,762.500		1 Q.	April, 1905
International Pump, pr	89¾	— ¾		11,350.000	6 cum.	1½ Q.	Nov., 1909
Lackawanna Steel	63	.....	Mar. 10	34,978,000		.....	.....
Lake Sup. Corp	27⅝	+ ⅛	Oct. 6	40.000.000		.....	.....
New York Air Brake	93½	—2½	June 17	10.000.000	8	2 Q.	Oct., 1907
Niles-Bement-Pond	104	.....	Feb. 3	8,500,000	6	1½ Q.	Dec., 1909
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Nov., 1909
Otis Elevator Co	55	.....	Mar. 15	6,375,300	3	1½ S. A.	Oct., 1909
Otis Elevator Co., pr	97	—1½		6,295,000	6 n. c.	1½ Q.	Oct., 1909
Pa. Steel	65	.....	May 10	10,750,000		.....	.....
Pa. Steel, pr	115	—1		16,500,000	7 n. c.	3½ S. A.	Nov., 1909
Pittsburg Coal Co	27¼	+ ¾	Mar. 9	28,104,600		.....	.....
Pittsburg Coal Co., pr	68½	—1⅜		27,071,800	7 cum.	1¾ Q.	April, 1905
Pressed Steel Car	52⅜	—1⅞	Feb. 17	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	106	.....		12,500,000	7 n. c.	1¾ Q.	Nov., 1909
Pullman	192¼	— ¼	Nov. 10	100,000,000	8	2 Q.	Nov., 1909
Railway Stl. Spring	50¾	—1¼	Mar. 4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	108	.....		13,500,000	7 cum.	1¾ Q.	Dec., 1909
Rep. Iron & Steel	46⅝	—1⅜	Oct. 20	27,191,000		.....	.....
Rep. Iron & Steel, pr	106¾	+ ⅛		20.416.900	7 cum.	2½ Q. †	Oct., 1909
Sloss-Sheffield	87⅞	—1⅞	Mar. 10	10,000,000	5	2 Q. †	Nov., 1909
Sloss-Sheffield, pr	119	.....		6,700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy. Co	32¾	— ¾	June 23	12,106,300	2	1 Q.	Dec., 1907
U. S. Pipe & Fdy., pr	84¼	—1¼		12,106,300	7 n. c.	1¾ Q.	Dec., 1909
U. S. Steel	88	—1¾	April 19	508,302,500	3 n. c.	¾ Q.	Sept., 1909
U. S. Steel, pr	124¼	—1⅜		360,281,100	7 cum.	1¾ Q.	Aug., 1909
U. S. Steel, 5s	105⅞	+ ⅛		463,?98,000	5	.....	.....
Va. Iron, Coal & Coke	71	—2	Sept. 21	9,073,680		.....	.....
Westinghouse Elec	85	— ¾	June 16	27,173,200*		1¾ Q.	Oct., 1909
Westinghouse Air Brake	144	+ ½	Oct. 5	14,000,000*		4 Q.	Oct., 1909

Par value of shares, $100, except those starred (*), $50.
†Includes deferred dividend of ¼ of 1 per cent.

Copper Stocks.

New York.—Amalgamated Copper closed 86¾, a net loss of 7.

Boston.—Butte Coalition closed 31⅛, a net loss of 1⅞; Calumet & Arizona closed 105½, a net loss of 3½; Calumet & Hecla closed 685, a net gain of 4; North Butte Mining closed 65¼, a net loss of 3¼; Quincy Mining closed 87, no change.

Financial Notes.

The Republic Iron & Steel Co. declared the regular quarterly dividend of 1¾ per cent on preferred stock, payable Jan. 1; the Calumet & Hecla Mining Co. declared the usual quarterly dividend of $8 per share, payable Dec. 22; the National Enameling & Stamping Co., the regular quarterly dividend of 1¾ per cent, on preferred, payable Dec. 31; the Tennessee Copper Co., a dividend of $1.25 per share payable Dec. 23, this being the first dividend paid by the company since Dec. 30, 1908, when a disbursement of $1.25 a share was made.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597
September	5,609
October	5,628

December 2, 1909

DUPLEX STEEL PROCESS.

In fiction it frequently occurs that an embarrassing situation is relieved by a marriage which dissolves all perplexities. Years ago an eminent engineer made the prediction that the open-hearth steel process will go to the funeral of the Bessemer process, and that was a startling prediction at the time, because the Bessemer process was then still the great tonnage producer. A marriage now appears in prospect rather than a funeral and as the processes are approximately of about the same age and have some good arguments to show that they can live more cheaply together than apart, the union seems to be quite a fitting one.

The rapid growth of basic open hearth steel manufacture in the United States in early years was due to the availability of large tonnages of scrap at low prices. Old material went begging, so to speak, but long ago it was recognized that the basic open hearth steel industry could not go on increasing at a rapid rate without making an entire change in the alignment. In THE IRON TRADE REVIEW of April 17, 1902, it was pointed out that scrap was destined to grow scarce in proportion to the rapidly increasing demand for it. A comparison was made, showing that the proportion of basic pig iron to basic open hearth ingots and castings was 53 per cent in 1897, 50 per cent in 1898, 47 per cent in 1899, 42 per cent in 1900 and 40 per cent in 1901, showing that so far the proportion of scrap used in the charge had increased, and quite rapidly. It was noted that prices of scrap, relative to pig iron, had been rising, but that on account of new erection of basic open hearth plants there would be further and larger calls for material and it was remarked: "Suddenly, therefore, instead of gradually, the basic open hearth steel manufacturer must be contented with less scrap" and, further, "Recourse must be had * * * * to such open hearth processes as permit the use of an all-pig charge." Owing to the fact that some large producers promptly adopted special processes on a large scale, it is only of late, or during sudden bursts of activity, that the scrap market has reflected an actual scarcity. The decreased proportion of scrap in the open hearth charge, predicted seven years ago, has come. The year before the prediction was made, the proportion of basic pig iron produced to basic open hearth steel ingots and castings produced was 40 per cent; in the past three years, 1906-7-8, taken together, the proportion has been 53 per cent.

From one viewpoint the duplex process is merely a means of avoiding the use of scrap. It is not desirable for the steel manufacturer who must buy both pig iron and scrap, the process being attractive rather to a steel manufacturer who must buy scrap at the market price, but who can make pig iron at a considerably lower price. Using merely representative figures, with scrap at $18, the cost of making pig iron at $14 and the cost of blowing the furnace metal at $2, a half pig and half scrap charge would cost an average of $16, while a charge of all pig, blown in the converter, would also cost $16, and in the refinements of working and in increased output a net saving may perhaps be figured, although it is proper to state that a clear case for the duplex process is not made out in all instances by any means. There has been no question about the feasibility in the south, for the reason that there the scrap is not available at all, and the choice is between duplexing and using a charge with a minor proportion of scrap.

From a broader viewpoint, however, the Bessemer converter in the duplex process is not to be regarded as a minor servant coming at the beck of the open hearth process to perform a minor function. The Bessemer vessel and the open hearth furnace are both principals in the transaction. Apart, each process has its limitations; the Bessemer process cannot get along with pig iron above the phosphorus limit permissible in the finished steel, and the open hearth process cannot get along without scrap. The union of the two, then, is based upon much the same principle as that which contributed to the prosperity of the Sprat couple, of happy memory.

At the present time, several important steel interests in the north are carefully considering the duplex process and the prospect is that more than one of them will definitely adopt it for a large part of their production. The merits of the process have even been canvassed for the Gary plant, although no authoritative statement has been made that its adoption has yet been seriously considered.

The capital outlay in duplexing is not very great, in proportion to tonnage results. The cost of the vessels with attendant equipment is but a small fraction of the cost of a complete Bessemer steel plant, and as the cost of an open-hearth plant for a given tonnage is very much larger than of a Bessemer plant, an increase in tonnage for an open-hearth plant means a large saving in capital which

can be diverted to the Bessemer department. Nor is the cost of operating the vessels large. The chief expense of the mere Bessemer steel making process is in the loss of weight of the metal blown, but at least one-half of this is due to the elimination of metalloids which must occur, whatever process is used, and of the remaining loss only a portion occurs with the partial refining in the converter in the duplex process.

As with many improvements, the duplex process is made more feasible than formerly on account of the great progress in mechanical devices, whereby material can be handled with more certainty and with much less cost than formerly.

It is possible that the duplex process may be adopted, in some cases, not by the installation of new converter capacity, but by the diversion to the new use of converters now employed for the production of steel by the ordinary Bessemer process. Even without such diversion the process which uses pig iron above the Bessemer limit is destined to grow rapidly, while the ordinary Bessemer process is marked for no change at all unless a decline.

It is not difficult to foresee that this trend may have an important influence upon the relative value of Bessemer and non-Bessemer ores, for when the cost of making steel by different processes is figured down to a fine point, wide fluctuations in the relative value of the two classes of ore cannot be countenanced unless the Bessemer ores are used only for special purposes, as to make pig iron for the acid open hearth furnace, the ingot mold foundry, etc., and to supplement the supplies of regular Bessemer steel makers when they are on occasion, as at present, pressed for material.

Right now a delicate readjustment in processes is occurring, the readjustment taking cognizance of broad and important influences; the relative scarcity of Bessemer ores due to their being mined at a rate out of proportion to their occurrence in the ground, the scarcity of scrap due to the rapid increase in its consumption, the demand for open hearth rather than Bessemer steel and the decreased cost of handling large masses of molten metal in the steel works.

The sphere of Bessemer steel has been steadily narrowing. It can rarely be furnished in plates, and in only a limited way, relatively, in structural shapes. Even in merchant mill products there is a distinct preference for open hearth material. For wheels and axles, Bessemer steel is not considered at all. For rails open-hearth steel has made rapid inroads, although it is a question whether the contest will ultimately prove as completely one-sided as was at first supposed. In sheet mill products and wire alone, Bessemer steel still holds undisputed sway and these, of course, are not relatively large tonnage lines. Many considerations prompt the reflection that a marriage between the two processes may prove to be the happiest solution of the position.

SWEDISH IRON INDUSTRY SUFFERS FROM DEPLETION OF FORESTS.

Industrial operations in Sweden, which have been interrupted since early summer because of the general strike proclaimed by the trades unions and the ensuing lock-out declared by the Swedish Employers' Federation, are again resuming normal proportions. The unions gave up the fight on Sept. 4, but the lock-outs remained effective until Nov. 13, at which time they were withdrawn by the iron works. Differences of minor importance in the other industries are now being cleared away and the men are returning to work in large numbers. The ore industry has been considerably embarrassed by the long period of idleness.

Commenting upon the lock-out and its effects, *The Ironmonger*, of London, states that little inconvenience has been caused to British consumers because of the large stock of Swedish iron products on hand at the outset of the difficulty, which stocks will now have to be built up. Continuing, this authority says:

There are several points which seem to have been pressing rather hardly upon the Swedish iron masters of recent years. For one thing, while the selling prices of finished and semi-finished iron declined severely during the period succeeding the last boom, very little relief was to be obtained from reduced costs of raw materials and labor, hence profits vanished. The outlook, too, as regards raw supplies is also the reverse of rosy. Sweden's forests, which have contributed so largely to the excellence of her iron and to its reputation for special purposes all over the world, have been ruthlessly spoilt to supply the needs of the papermakers, who require woodpulp in ever increasing quantities, and whose demands have driven up the price, while at the same time the more accessible supplies have been seriously curtailed. It is hoped to meet this difficulty, so far as the iron trade is concerned, by extending largely the use of electrical power for reducing the ore; but the general adoption of so radical a departure from the methods hitherto employed involves an industrial revolution, and this is not to be brought to pass in a day. To some small extent relief may be obtained in the direction indicated, but the process is bound to be slow, and many more square miles will be stripped of timber before Swedish iron is produced electrically on anything like an important scale.

In referring to the general position of the trade, the official report of the Swedish Ironmasters for July, August and September, which has just been issued, states that owing to the strike the output of Swedish iron and steel during August and September showed a reduction compared with the previous year of about 75 per cent, while even if operations were resumed generally at an early date, many of the works would be unable to procure supplies of raw material sufficient to tide them over the winter months. There is a steady demand for Swedish iron for export, and with the improved outlook in the foreign markets, especially America, better times should be ahead.

NAMING NEW SHIPS.

President Harry Coulby, of the Pittsburg Steamship Co., has decided to name the freighters building at the Ecorse yard of the Great Lakes Engineering Works for his company, after prominent men in the United States Steel Corporation and subsidiary companies. The first freighter to be launched will be named in honor of William B. Dickson, first vice president of the Steel Corporation; the second will be named in honor of William J. Olcott, president of the Oliver Iron Mining Co., and the third in honor of William P. Palmer, president of the American Steel & Wire Co. The old steamer, William P. Palmer, was sold by the Pittsburg Steamship Co. about two months ago and is now on the Atlantic coast.

The steamer building at the Lorain yard of the American Ship Building Co. for Capt. Charles L. Hutchinson, will be launched on Dec. 11, and will be christened in honor of A. A. Augustus, who is connected with the Ellsworth Coal Co.

STOCK DIVIDEND

Of Twenty Per Cent Declared by Nova Scotia Steel & Coal Co.

Toronto, Can., Nov. 29.

A meeting of the directors of the Nova Scotia Steel & Coal Co. was held at Montreal Nov. 26. In view of the fact that the profit and loss account showed a balance of accumulated profits up to the end of 1908 amounting to $1,219,221, and that during the last eight years $1,500,000 of the earnings had been expended on extensions of plant and equipment properly chargeable to capital account, it was decided to recommend a stock bonus or dividend of 20 per cent to common shareholders, each of whom will receive one share of common stock for each five shares held. A cash dividend of 1 per cent will also be paid. It was stated that $3,500,000 of the new 5 per cent bonds and $1,000,000 of the new debenture stock of the company had been disposed of realizing over 94 per cent of par. The work at Wabana, Newfoundland, in the development of the submarine ore areas and installation of plant has been steadily carried on, and the company is spending a considerable sum in installing a new plant at New Glasgow to increase the output of finished products. The output of the coal mines for the present year aggregating 800,000 tons has been the largest in the company's history.

FIRST CARGO OF ORE SHIPPED TO CLEVELAND.

The Dominion Bessemer Ore Co. has shipped the first cargo of its ore at Port Arthur for Cleveland, from which port it will go to the furnaces at Dunbar, Pa. Shipments will continue until the close of navigation. The company expects next season to market some of its output at Sault Ste. Marie, an examination of the ore having been made by representatives of the Algoma Steel Co., which is understood to have been satisfactory.

PASSAIC STEEL PLANT BOUGHT BY BONDHOLDERS.

The properties of the Passaic Steel Co., Paterson, N. J., were sold Nov. 26, under orders of the Court of Chancery, to T. H. Conderman, of Philadelphia, representing the bondholders' committee, at his bid of $400,000. Some four months ago, when the plant was first offered, it was knocked down to Lawrence Fagan, of Hoboken, N. J., for $190,000, but the bondholders succeeded in having this sale set aside on the ground that they were not given an opportunity to make a higher bid. Since the company has been in financial straits, only the bridge and structural shop has been in operation, but it is understood that a reorganization will now be effected and the plant operated on a more extensive scale. It occupies an extensive and valuable acreage in the heart of Paterson.

COLD WEATHER HINDERS LOADING AT ASHLAND.

The cold weather has brought the ore shipments almost to a complete standstill. With the ore frozen solid in the cars but little of it can be thawed out and loaded into the boats. At the Northwestern ore dock eight boats are now assembled waiting for ore, and unless the weather moderates some of these boats will be here all winter, for every night the ice is commencing to form on the bay. At the Northwestern docks they have been working for several days trying to load the steamer Dunham, and with the progress that is being made, it will be the end of the week before even that one boat gets its full cargo.—The News, of Ashland, Wis.

BRITISH COMPANY MAY BUILD NEAR VICTORIA, B. C.

The Middlesbrough Steel Strip & Hoop Co. Ltd., Middlesbrough, England, is engaged in preliminary work aiming toward the establishment of an iron and steel plant, including blast furnaces and rolling mills, on Vancouver Island, near Victoria, British Columbia. The location of the plant is close to some well known deposits of bog ore. A representative of the Middlesbrough Steel Strip & Hoop Co., is now in British Columbia making arrangements. The parent company is a successor of the late J. F. Pease & Co., Ltd., and controls rolling mills in England, manufacturing strips, hoops, nails, tubes, etc.

The Steel Corporation has blown in another of its Gary furnaces and the small stack at Zanesville, O. Its percentage of capacity in operation, however, continues at about the same figure as heretofore.

Reports of gross earnings of 45 railroads for the second week of November show an increase of 15.05 per cent.

COKING COAL LAND PURCHASED BY WM. G. MATHER.

William G. Mather, president of the Cleveland-Cliffs Iron Co., Cleveland, has purchased from J. V. Thompson, of Uniontown, Pa., and associates, a block of 3,000 acres of coking coal in Greene county, at a reported price of $1,750,000. The property extends along Ten Mile creek, in Morgan township, to the town of Jefferson, running back to Castile run, in Morgan township. It is bounded by the holdings of the Monongahela River Consolidated Coal & Coke Co., the Bessemer Coke Co., the Western Coke Co., the Emerald Coke Co., and by the property of J. G. Paterson and F. M. Osborne, of Cleveland. Those companies and individuals that are interested in Greene county coal land are confidently expecting that a railroad will shortly be built to tap this territory, and it is believed that it will follow the course of Ten Mile creek. When adequate traffic facilities are provided, it is expected the coke-making development of the region will be rapidly advanced. Associated with Mr. Thompson in the deal are I. W. Semans, Geo. B. Moredock, Geo. W. Struble, A. R. Struble and Joseph S. Elliott, of Fayette county; Samuel Bierer, of Hiawatha, Kan., and James H. Clark, of Illinois.

WILL DEVELOP GEORGIA RED ORE LANDS.

The Shinbone Red Ore Co. has been incorporated by Chattanooga, Tenn., investors, who will undertake the development of iron ore deposits in Walker county, Ga. The incorporators include G. H. Miller, John H. Hill, O. F. James and F. L. Miller. The company has a capital stock of $100,0000, and has purchased 2,500 acres of land, which it is proposed to develop. The company is located 25 miles south of Chattanooga, Tenn., and one-half mile of railroad construction will be undertaken to connect the proposed mine with the tracks of the Southern Railway.

Shipments of tin plates and sheets from Great Britain to the United States were four times as heavy during October as during the corresponding period last year, the total movement being 8,644 tons. This country is Great Britain's largest customer, with the British East Indies a close second.

The output of the Calumet & Arizona company's copper mines for October was 2,360,000 pounds; while the output of the Superior & Pittsburg was 2,084,000 pounds.

BETHLEHEM SECTIONS

Used in Many New York Apartment Projects Recently Closed.

A considerable number of local buildings in which Bethlehem sections will be used have been closed in the New York district of late. The more important of these projects, with the name of the fabricating interest, are as follows: 12-story loft at Twenty-eighth street and Madison avenue, Radley Steel Construction Co., 500 tons; St. Joseph's Home for the Aged, Sixteenth street near Seventh avenue, Hinkel Iron Co., 150 tons; apartment house Seventy-ninth street near Amsterdam, receivers of Passaic Steel Co., 350 tons; store building for Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., Metropolitan Bridge Co., 200 tons; two loft buildings on Sixth avenue, Metropolitan Bridge Co., 550 tons; apartment at Ninety-third street and Riverside Drive, A. E. Norton Co., 500 tons; loft building for Union Realty Co., Syracuse, Metropolitan Bridge Co., 700 tons; four 8-story apartments on West 100th street, Radley Steel Construction Co., 800 tons; and the Sloane warehouse, already noted, Levering & Garrigues, 1,200 tons.

CROCKER-WHEELER CANADIAN PLANT.

The Crocker-Wheeler Co., of Ampere, N. J., is establishing a branch plant in St. Catharines, Ont., where it has purchased the Ross Traction Engine plant for $5,000, and arranged with the city for a fixed assessment at $10,000 for ten years. The building purchased will be greatly enlarged and operation started with a staff of 100 men. The company has already a $250,000 contract in connection with the Winnipeg power works.

CUSTOMS DECISIONS.

The treasury department at Washington has instructed the collector of customs at Philadelphia to allow the Baldwin Locomotive Works the usual drawback on the exportation of boiler tubes manufactured from imported iron and steel tubes.

The collector of customs at Boston, Mass., has been instructed to pay a drawback of the duty except 1 per cent on the exportation of hack-saw blades manufactured by the Henry G. Thompson & Son Co. of New Haven, Conn., from imported sheet and ribbon steel.

The treasury department directed the collector of customs at Boston, Mass,. to give a drawback or refund of all the duty except 1 per cent to the Potter & Johnson Machine Co., of Pawtucket, R. I., on the exportation of finished machine parts made from the importation of rough cast and forged iron, steel and other metals. The parts were manufactured in connection with the testing of automatic chucking and turning machines.

INCREASE OF CAPITAL.

Respecting its recent increase of capital stock, the Parkesburg Iron Co., Parkesburg, Pa., advises that while some time ago it erected a tube plant at Parkesburg, this plant was built from its working capital. The new increase is for the purpose of providing additional working capital and to take care of new equipment as it might be required, but at this time the company does not contemplate making any further large improvements.

WILL START TWO MILLS.

The Union Sheet & Tin Plate Co., Pittsburg, is making some improvements in the galvanizing department of its sheet works at Hazleton, Pa. The company expects to start two mills at this plant about Dec. 4. John McCullough, formerly of the McCulllough Iron Works, Wilmington, Del., has been made superintendent of the Hazleton plant.

A VERY LARGE DEPOSIT DEVELOPED.

Further development work at Benson Mines, N. Y., is showing up an enormous ore body, on part of which there is only a 14-foot overlay. Diamond drills indicate the deposit to be much more extensive than anticipated and of great thickness; the ore is of Bessemer grade. The nodulizing plant will be ready for operation within the next few weeks.

CHOSEN TRUSTEE.

Chas. M. Schwab, president of the Bethlehem Steel Co., has been elected a trustee of Lehigh University, succeeding the late William H. Sayre. John Fritz has been a member of the Lehigh board of trustees for a number of years.

Two and a half acres of land on Center street, Tacoma, Wash., have been purchased by the Tacoma Ornamental Iron & Wire Works, upon which the company will erect a new foundry and fabricating plant to take care of increasing business. The company will make its own plans and build by day work.

WESTINGHOUSE CHANGES.

A number of important changes in the sales organization of the Westinghouse Electric & Mfg. Co. have recently been put into effect. S. L. Nicholson has been appointed general sales manager and has direct charge over the sales policies of the entire company. Mr. Nicholson has been with the company for eleven years in many different capacities, as salesman, as district department manager and as industrial and power sales manager for the past five years, from which last position he resigned to take the present post. Before coming to the Westinghouse company he was with the C. & C. Electric Co. He is perhaps best known to motor manufacturers as the organizer and president of the American Association of Motor Manufacturers.

Charles Robbins, who has for many years been connected with the company in the industrial and power sales department in connection with the sale of industrial motors, has been appointed manager of this department. His headquarters will continue to be at East Pittsburg.

G. Brewer Griffin has recently been appointed manager of the detail and supply sales department. Samuel A. Chase, who for the past few years has been with the New York sales office of the Westinghouse company as a special detail and supply salesman, has recently resigned to accept a position with the White Investing Co., of New York City.

SUPERINTENDENT OF SAUCON PLANT RESIGNS.

Samuel B. Sheldon, for some time superintendent of the Saucon plant of the Bethlehem Steel Co., South Bethlehem, Pa., has resigned. He was for a number of years general superintendent of the Lackawanna Steel Co. before going to South Bethlehem. He will be succeeded by C. H. Reynolds.

To Make Metal Window Frames.—Edward H. Lunken, of the Lunkenheimer Co., Cincinnati, has purchased five acres of land at Twelfth street and Fifty-sixth avenue, Chicago, and has taken an option on five more acres. It is the intention of the company to erect a plant for the manufacture of metal window frames and window sash. A force of 500 men will be employed.

The Acorn Brass Co., of Winnipeg, Man., has been incorporated with $20,000 capital stock.

HARVESTER COMPANY PROFIT-SHARING A SUCCESS

By Geo. W. Perkins.*

In the progress and development of American business methods there is probably no subject more worthy the attention of the Civic Federation than the one which is under discussion at this conference; for profit sharing, insurance, pensions, welfare work, etc., are vital elements in the relations between capital and labor.

If, as many of us have come to believe, co-operation in business is taking and should take the place of ruthless competition,—if this new order of things is better for capital and better for the consumer, then in order to succeed permanently it must demonstrate that it is better for the laborer; and if profit sharing, pensions, insurance, and the like mean anything, they must mean co-operation between capital and labor,—co-operation in the broadest, most helpful and enduring form.

Plans for profit sharing, pensions, and the like, are not new in American business. They have been tried off and on, here and there, in various forms, for a long time, and up to a few years ago many of them had fallen more or less short of success. It is my judgment that the reason for this can be found almost wholly in the fact that the unsuccessful plans did not embody a true, an honest, and a fair spirit of co-operation. A secret, perhaps almost an unconscious purpose, existed to benefit the business in question out of proportion to the labor employed in the business; and no such plan having such a purpose can permanently succeed, for the selfish points in it will work to the surface sooner or later, and cause failure.

On the other hand there should be no sentimental philanthropy about this great question. It is purely a business question. Profit sharing pensions and the like, from a pecuniary standpoint, are a profitable thing for a business and also for its labor, or for neither. No American, worthy of being called a man, wants something for nothing.

Because of the enormous growth of business affairs in the United States many business concerns have passed beyond the period where one man or even twelve men can keep a close supervision over all the branches of a given business undertaking. Now it goes without saying that no business will run itself,—either in its executive functions or in the machines themselves at the factory or plant. In all the inventions and ingenuity that have been brought to bear on business affairs in the last quarter of a century, nothing has been found to take the place of the human mind. Nothing has been found to take the place of individual incentive to accomplish results. Nothing has been found to take the place of a man's ability to do,—with a proper incentive behind that ability,—and no such substitute ever will be found. It is, therefore, of the utmost importance to American business interests of today and tomorrow that every man in any given concern be so associated with that concern that he will give the best there is in him to the performance of the duties assigned to him. There is a vast difference between the work that a human being performs in a perfunctory, machine-like manner, and the work that he performs with a keen, loyal interest in what he is doing; and in just this difference does success come to the individual and come to a large concern, if it be so fortunate as to have a force of individuals who are working with this spirit.

Real Co-operation.

If profit sharing means anything, if providing for old age means anything, if caring for those who become ill or injured while in the service means anything, it should mean the fostering of the interest of men in their work, whether that work be sweeping out the office, shoveling coal, or presiding over a great commercial company. In short, it should mean real co-operation between stock-holders, managers and employes.

The management of the International Harvester Co., its subsidiary and affiliated companies, believing in the above theories, set out several years ago to see how nearly it could come to applying them practically to its business. As a result it has devised and put into effect plans covering the following:

First.—Profit sharing.

Second.—Insurance covering sickness, accident and death.

Third.—Old age pensions.

Briefly stated, these three plans are as follows:

First.—Profit sharing. The profit sharing is divided into two heads—the first one being a certain sum of money set aside by the company in cash out of its earnings each year,—the size of the sum depending on the size of the company's profits,—the percentage scale being stated. This is for immediate distribution in cash among the men who make a satisfactory showing for the year.

The distribution of the sales department's share in these profits is based upon two important points,—first, increase of sales; second, reduction of selling expense.

In the works the profits are distributed for increased production, decreased cost, or a combination of both.

Employes in any branch of the company's service, showing marked ability during the year, are entitled to receive recognition under this profit sharing plan.

The second classification of profit sharing is the sale of the company's stock to its employes. This stock is purchased outright by the subscriber on an installment plan. The total amount that any employe is allowed to subscribe for is limited to the amount of his annual salary, and he cannot pay in excess of 25 per cent of his salary in any one year; therefore, all are treated alike.

Preferred stock to the amount of 12,500 shares and 15,000 shares of common stock were offered for sale last July at a price below the then market value. In addition to the regular dividends there is allowed a bonus of $4 and $3 respectively, on each share of the preferred and common stock, each year for five years,—the only condition being that a man must be in good standing in the company's service during each of these years, have his stock, and either have paid or be paying for it. In such cases, as the men leave the company's service or discontinue paying for their stock, the company continues placing these $4 and $3 payments on such stock into a fund, and at the end of five years this fund will be divided among such subscribers as fully paid for their stock and remained in good standing in the company's service during the five-year period. The result of this plan, in a word, is that a man begins to buy a share of the company's stock at a price below the market value; he is

*Read at session of National Civic Federation, Nov. 23, in New York, by George W. Perkins, chairman of the finance committee of the International Harvester Co., chairman of the industrial insurance commission of the Civic Federation, and director of the United States Steel Corporation.

allowed to pay for it in installments, paying 5 per cent interest on deferred payments; he is credited with 7 per cent dividends on the preferred stock and whatever dividends are declared on the common stock. In addition to this, he is credited with, respectively $4 and $3 per share, each year, on the preferred and common stock, and at the end of five years receives a further benefit by way of a share in a fund made up of such $4 and $3 deposits as are made by the company on account of those who do not continue under the plan. It will be seen that this offers the men an exceedingly satisfactory form of investment in the business in which they are employed, and gives to the company the great advantage of anchoring its organization to the business.

The stock offered last summer was largely over-subscribed and the company today has over 4,300 employes as stockholders.

Second.—The Company's Benefit Plan. On Sept. 1, 1908, the Employes Benefit Association of the International Harvester Co. was inaugurated. This association was organized for the men, and it is today run by the men. It is governed by a board of 30 trustees, one-half of whom are elected by ballot. The contributions are 2 per cent of the employe's wages or salary, and the benefits derived are as follows: Two years' pay for death due to accident; one year's pay for death due to sickness, and half pay for disability due either to sickness or accident, etc.

Membership Voluntary.

The membership in this association is purely voluntary, and any one joining and later receiving benefits is not required to waive any legal rights. That this may be a co-operative movement the company's share in the plan is an annual contribution of $50,000 to this association, provided the average membership equals 75 per cent of the employes in the factories and works. Over 75 per cent have joined and therefore the company is making its contribution of $50,000.

The best answer as to whether the men approve of this association is made by stating that 21,600 people are contributing members to it.

In the first 14 months of its existence over $200,000 has been disbursed in benefits.

Third.—The Pension Plan. The pension plan was inaugurated as a recognition of long and faithful service. All employes 70 years of age and over, and who have worked for 20 years, are pensioned; while employes, who have reached the age of 65 years, may voluntarily apply for a pension. The minimum amount of pension is $18 per month and the maximum $100 per month. The company has not favored higher salaried employes at the expense of the laboring man. All pensions are figured on the same basis,—that is, on the pay a man receives during his employment, and on his length of service; therefore, there are no inequalities in the amounts paid.

All the benefits and expense of the pension plan are borne by the company itself—no contribution of any kind or nature being made to this plan by the employes.

Welfare Work.

The company is also doing welfare work. It is called welfare work for lack of a better name. It is as much a business branch of the company as any other division. The important features of this work are protection against injury, sanitation, health, educational work, charities, recreation, etc. The welfare work is controlled by an advisory board composed of the superintendents of all of the works, who, through an executive committee, dictate the welfare activities of the company. Special attention is given to protection against injury and to sanitation. The accident hazard can never be removed because of the human element; that is beyond the realm of possibility. Therefore, the company is trying to arrive at the point where the occupation is surrounded with every known safeguard and only the man is the hazard. The foreman of each department is impressed with the fact that he is the one who is responsible for the safety of his men, and by securing the co-operation of every one it is hoped to establish a standard that will be of benefit and use to others. Improved sanitary conditions mean better health, and better health means better work—and this matter is having the constant attention of the company's managers of welfare.

In the year 1908 the Harvester company spent about $100,000 in its welfare work. This year it will probably spend a somewhat larger sum.

A Matter of Business.

The company has been criticized by managers of other companies for making the plan above outlined too liberal and attractive. It has been said that the plans will be too expensive to the Harvester company and that their cost will be very large. There is no doubt of the truth of this criticism insofar as the cost goes. No concern has ever put out plans that involved the application of so large a percentage of its profits to such plans. But the Harvester company did not do this out of pure philanthropy. It had no intention of passing around a hat full of money, that employes might help themselves. It went into these enterprises in a purely business spirit, believing that the plans would so knit its vast organization together, would so stimulate individual initiative, would so strengthen and develop the *esprit de corps* of the organization as to make it possible for the company to increase its business and its earnings—and with the spirit of being willing to share this increased success with its organization. So far the company has every reason to congratulate itself on the result. In all parts of the company's business, at home and abroad, in the office force, in the factories, in the sales department—everywhere, the average interest of the individual in the business is greater than formerly. The saving of the waste here, there and everywhere, is noticeable. The employes throughout the organization are vying with one another more and more to improve their respective branches of the business. This means profits for the stockholders, means extra compensation in various ways for the employes—in short, means co-operation that is real, that is beneficial to one and all.

ORDERS MAGNETIC SEPARATOR.

Witherbee, Sherman & Co., Mineville, N. Y., have placed an order for equipment for a magnetic separating plant with the Allis-Chalmers Co., of Milwaukee. The plant will be situated between stacks A and B and will be designated as "Harmony mill." Its capacity will be 850 tons every 10 hours. Equipment includes crushers, elevators, screens, rolls, etc. Manganese steel is used in all parts that are subjected to extreme wear.

The Emaus Foundry & Machine Shops, Emaus, Pa., began operating its new machine shop recently. The shop occupies a two-story brick building, 36 x 100 feet, with an annex, 20 x 59 feet, the cleaning department being located on the first floor and pattern department on the second floor. The officers of the company are: President, John Angeny, of Macungie; secretary, Wesley Muth, of Emaus; and treasurer, Milton Frey, also of Emaus.

AMONG MACHINERY MAKERS.

NEW YORK.

Prices Advance Moderately—Marked Scarcity of Skilled Labor.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Nov. 30.

Although no additional lists of importance are before the machine tool trade, the demand from the smaller users is apparently increasing and a very fair volume of business is being closed. The holiday interruption of the past week has been felt to some extent but on the whole the month just ending has been extremely good, and those in best position to judge accurately express the opinion that the outlook is steadily improving. Deliveries continue to prove a troublesome factor in certain lines, not only with makers of machine tools but with manufacturers of general equipment as well; for instance, one representative crane interest is now booked about four months ahead and has been forced to lessen its activities in the way of contracting until this situation is remedied. The effect of the enormous business placed during the fall has been to advance prices in a moderate way, though in some lines this price readjustment is only now taking place. The demands of the automobile trade seem to be insatiable. One conservative authority estimates that during the coming season at least 50 per cent more cars will be built than during the season just ended, and this increase will be limited only by the ability to secure gear-cutting machinery and other similar equipment. Although the machine tool trade is complaining bitterly that many of its best machinists have been coaxed over to automobile plants, owners of the latter insist that there is still a marked scarcity of competent labor and that this constitutes one of their greatest difficulties.

Naylor Bros., Peekskill, N. Y., who recently acquired the old United States Stove Foundry at that place, are rebuilding it along modern lines, with the idea of conducting a general jobbing foundry business, though specializing in brick-making machinery. Considerable equipment has been arranged for, including one 10-ton Shepard crane.

The Delaware & Eastern railroad, with offices at 7 Wall street, has had inquiries out for a small amount of equipment in connection with the extension of its line. This is a road which eventually will connect the anthracite fields with Schenectady.

It is understood that the equipment for the new plant now under construction at Watcessing, N. J., for the A. P. Smith Co., Newark, N. J., will be furnished by the Whiting Foundry Equipment Co. This includes five cranes, two of 38-foot span and of 10 and 15 tons capacity.

Revised returns of the recent elections show that a substantial majority was given the project to expend $7,000,000 in connecting Lakes Cayuga and Seneca with the barge canal system. October expenditures on the barge canal were slightly in excess of $960,000, bringing the total up to date to $15,080,408. The total amount of work under contract is now $48,191,940.

The Bridgeport Brass Co., Bridgeport, Conn., is constructing some important additions to its plant, one large building already being enclosed. The equipment requirements have largely been filled. Babcock & Wilcox boilers will be installed and four Shepard cranes have been ordered.

The Lakeside Forge & Wrench Co., Springfield, Mass., is moving its works to Erie, Pa., where the manufacture of drop forging and drop forged wrenches will be continued. Eugene Childs is president of the company, which recently acquired the plant of the Springfield Drop Forge Co.

CINCINNATI.

Orders For Machine Tools More Widely Distributed.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Nov. 30.

The past week was interrupted by a holiday which naturally had an influence in curtailing production, but otherwise the situation is without material feature. The smaller lines of machine tools continue active with the shops sold ahead while the heavier lines have not shown particular improvement, although there is more demand than sixty days ago for this class of machines. The orders being received have been more widely distributed during the latter part of the month and the automobile demand has become less conspicuous. The volume of new business booked during November was probably not quite equal to the October record. This may be accounted for, however, by the sold up condition of some shops and consequent inability to furnish desired deliveries. There is a steady and insistent call for help in the shops and the growth and expansion of the machine tool industry in this center is steadily enlarging.

The Sebastian Lathe Co. is preparing to double its output by the erection of an additional shop about equal to its present capacity. Plans are now being drawn and the work will be prosecuted as rapidly as possible.

The Andrews Steel Co., of Newport, Ky., is installing an additional open hearth furnace to its present plant. The contract for erecting the furnace has been given to the S. R. Smythe Co., of Pittsburg. This will increase the capacity of the plant for billets, sheet bars, and slabs about 100 tons per day. The American Bridge Co. has been awarded the contract for erecting the extensions to the buildings to cover the furnace, and the Duff Patents Co., Pittsburg, has the contract for gas producers.

The executive and entertainment committees of the Cincinnati branch of the N. M. T. A. were entertained at dinner at the residence of S. P. Egan of the J. A. Fay & Egan Co., after which the regular meeting of the committee was held. The next quarterly dinner of the Cincinnati branch will be held at the Business Men's Club on December 15, at 6:30 o'clock. The meeting and dinner gives promise of being of unusual interest. Dr. Wm. H. Tolman of New York, director of the Museum of Safety and Sanitation, will deliver an illustrated lecture on "Accident Prevention;" Edwin E. Bartlett, ex-president of the Boston branch, will speak on "Co-operation," and C. H. Norton, of the Norton Grinder Co., Worcester, Mass., will talk on "Industrial Progress." About twenty-five manufacturers of Muncie, Ind., have signified their intention of attending the meeting.

MILWAUKEE

With Better Prospects Than in Years Approaches The New Month.

Milwaukee, Wis., Nov. 30.—Machinery manufacturers in the Milwaukee district approach December's business outlook with a greater spirit of optimism than in any month during the last three years. Figures already at hand for the eleven months of the

year show great gains over the previous year.

An attempt was made last week to wreck a large amount of structural material shipped to Green Bay, Wis., by the Wisconsin Bridge & Iron Co. for the new bascule bridge. Several sticks of dynamite were set off under the piles of steel, and about one carload was rendered unfit for use. Labor troubles are said to have been responsible for the attack. The company has offered a reward of $500 for information leading to the conviction of those responsible, and the Milwaukee company's offer was doubled by Greiling Bros. who are the contractors. The bridge company has had previous experience with dynamiters, at Chicago and Clinton, Iowa.

The Great Northern road has awarded the contract for rebuilding the upper portion of its No. 2 dock at Allouez to Schmidt Bros & Hill, contractors, Superior, Wis. The work will cost between $300,000 and $350,000.

The Manitowoc (Wis.) Iron & Metal Co. has leased a track at York and Main streets, Manitowoc, and proposes to build a brass furnace.

The Prescott Mfg. Co., of Marinette and Menominee, has the contract for all equipment and auxiliary machinery in the new mill for the I. Stephenson Lumber Co., at Wells, near Escanaba, Mich. The equipment includes four band mills, one re-saw, one rift machine and other tools.

Plans have been completed for a large addition to the plant of the Milwaukee Malleable & Gray Iron Works at Layton Park, Milwaukee. The building will be of brick and steel construction, 50 x 112 feet.

The Vetter Mfg. Co., of Stevens Point, Wis., is converting its power equipment from steam to electricity.

The International Harvester Co. has started work on a new warehouse, to be erected at Park street and Fifteenth avenue, Milwaukee, at a cost of $90,000. The dimensions are 98 x 191 feet, six stories high, of reinforced concrete construction.

The secretary of the interior has awarded the contract for nine transformers for use in the operation of pumps in the Salt River (Ariz.) irrigation project to the Allis-Chalmers Co., at $8,110.

Officials of the Pressed Steel Car Co. estimate that the total orders for steel cars placed so far this year aggregate between 160,000 and 170,000, compared with 60,000 in 1908 and 150,000 in 1907.

CLEVELAND.

General Machine Tool Trade Not Entirely Satisfactory.

Office of THE IRON TRADE REVIEW,
Browning Building, Nov. 30.

Although the machinery trade in this district has been improving steadily during the past six months, it has not followed the pace set by the other lines of industry; and were it not for the stimulus given it by manufacturers of automobiles and accessories, machine tool builders would be considerably less busy than they are at the present time. The feeling, prevalent among machinery dealers several months ago, that the general trade would be at least equal to that dependent upon the automobile industry before the end of the year, has not been borne out by actual conditions, due largely to the fact that the railroads have done considerably less buying than was anticipated. However, requisitions are being received from this source more generally now, and it is expected that the new year will bring a rather decided buying movement on the part of the railroads. A contract for 200 spindles will undoubtedly be taken up by a local dealer within the next few days. An important feature of the market is the gradual strengthening of prices that has been taking place during the past few months; advances that went into effect Nov. 1 are in some cases the fourth or fifth that has occurred in the past four or five months.

The Ohio Ceramic Engineering Co. advises that it is falling behind on its orders, and that from the number of inquiries being received, the prospects are that it will have more than it can do during the coming year.

The Heisler Co., St. Mary's, O., has just shipped to the Pennsylvania Tunnel and Terminal Station, a large flywheeel pumping engine for elevator service, which is to be installed in the new Terminal station, New York City. This engine is to operate against a pressure of 300 pounds per square inch. Among other orders recently received by this concern are the following: From the Pennsylvania Tunnel and Terminal station, for boiler feed pumps, to be installed in this company's plant at Sunnyside, L. I.; from the Erie County Electric Co., boiler feed pump to be installed in its new power house, now being erected at Erie, Pa.

The Standard Boiler & Plate Iron Co., Niles, O., advises that it has recently made a 160-foot addition to its plant.

The Ideal Electric & Mfg. Co., Mansfield, O., finds it necessary to run overtime to take care of the present volume of business and, anticipating a continuance of present conditions regarding orders, is placing orders for a number of new machine tools.

The Hill Clutch Co. has recently received contracts for building complete rope drives for the following concerns: H. F. Watson Co., Erie, Pa.; Fox Paper Co., Lockland, O.; American Box Board Co., Grand Rapids, Mich.; Howard Paper Co., Urbana, O.; Michigan Alkali Co., Detroit; Kansas Natural Gas Co., Chanute, Kans.; Independent Steel & Wire Co., Kenova, W. Va. The Hill company further reports that inquiries and orders for this class of apparatus during the past six months have been as brisk as during the corresponding periods of 1906 and 1907.

The De Forest Sheet & Tinplate Co., Niles, O., advises that its plant, which was placed in operation Nov. 1, is working to its entire satisfaction and that there has been no occasion for any shut-down due to mechanical difficulties or break-downs of any sort. This concern has increased its capital stock from $10,000 to $100,000; the capital stock of two subsidiary concerns has also been increased, that of the Basic Steel Co., Niles, O., from $30,000 to $40,000, and that of the T. T. Metal Roofing Co., from $10,000 to $40,000. This has been done to provide larger working capital and for further contingencies. The De Forest company is about to let the contract for a new office building, of brick, steel and concrete construction which will be about 50 by 70 feet in size.

The Buckeye Rolling Mill Co., Newark, O., has taken over the plant of the Ohio Rail Co. and is enlarging and improving same for the purpose of manufacturing light rails.

The Banner Iron Works, St. Louis, announces the election of W. T. Koken, Met. E., as its new president; H. W. Frielingsdorf as vice president and general manager, and E. C. F. Koken secretary and treasurer. The company contemplates erecting new buildings and modernizing the plant, so that it will be able to make steel castings by the converter process. The arrangement for machinery, etc., has not yet been made, but will be by Jan. 1.

CHICAGO.

Machine Tool Trade Slower—Automobile Builders Have Confidence In Future.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Nov. 30.

The machinery trade has not enjoyed as flourishing business conditions for two or three weeks as were prevalent for several weeks previously, but, at the present writing, there appear to be indications of another revival in this branch of business. Inquiries are somewhat more numerous, and there has been a fair number of sales consummated. Of course, the fact that the large buying of machinery by the automobile interests is not at present the predominating factor in this line, has made a very great difference in the volume of business. However, it can not be doubted that the automobile manufacturers will continue to be large buyers of machinery and machine tools, from time to time, although the machinery business is by no means dependent on any one line of industry for its existence. Makers of automobiles bought large quantities of machinery in the past few months, but they have filled their present requirements in that direction, and will not be in the market for anything like the same number of machines for some time to come. But they are looking forward to the future in their business with a great deal of confidence, as is evidenced by the large purchases which they continue to make in the line of steel products. Shafting is being taken by them in very large quantities, as is cold-rolled steel of various kinds, so that the mills in this latter line find themselves at least 90 days behind in the execution of their orders. A very convincing bit of evidence that the automobile trade looks for no serious dimmution in its sales is found in the inquiry which some manufacturers are making for tool steel, for delivery as far ahead as 1911. In connection with automobiles, it is interesting to note that the bicycle, which was supposed to have had its day, is being made and sold in as large quantities as ever. It is pointed out that the history of the automobile business will not be unlike that of the bicycle.

The most interesting item of news to the makers of machinery, in the past few days, has been the entrance into the market of the Oregon Short Line for a long list of machinery and tools, said to amount to $150,000. The office of the purchasing agent is located at Salt Lake City, Utah.

After a lapse of two years, the management of the Robins Conveying Belt Co., has again passed into the hands of Thomas Robins, who is now president of the company of which he was the founder. When the control of the company passed into other hands, more than two years ago, Mr. Robins formed the Robins New Conveyor Co. This company and the original one now have been consolidated under one organization to be known by the name of the original company, with Mr. Robins at the head, and C. Kemble Baldwin as chief engineer. The Chicago offices of the reorganized company will be in the Old Colony building.

Mention was made in a recent issue, of the enlargement contemplated by the Weller Mfg. Co., of Chicago, which only three years ago, increased its floor space by 30,000 square feet. The company now advises THE IRON TRADE REVIEW that the additions now being made, are on a tract of land recently purchased, consisting of eight acres, and located on the Chicago, Milwaukee & St. Paul railway, at Forty-fourth avenue and Cortland street, Chicago, where an entirely new plant of modern design is to be erected, having a capacity of treble the present one. The property acquired is now vacant and it is the intention to erect buildings to house the company's machine shop, sheet metal, conveyor, bucket, wood-working and foundry departments, of the most modern and approved type for that class of work.

The buildings will be steel construction throughout, saw-tooth roof, with the exception of the foundry. They will be equipped with the most modern labor-saving devices obtainable. The building for the storage of patterns will be fireproof throughout. There will be a modern office building, and the shipping-room will be designed for quick and accurate handling of orders. It is expected to have the plant ready for occupancy by May 1, 1910.

PITTSBURG.

Mill Equipment in Demand—Important Contracts Pending.

Office of THE IRON TRADE REVIEW,
510 Park Building, Nov. 30.

The new machinery inquiry coming out for extensions and improvements to iron and steel plants is scarcely as brisk as it has been but this is not to be interpreted adversely as there has been an exceptional volume of work in this line presented for the attention of equipment makers during the past three months. There is also a number of important contracts pending which will be closed shortly and several tentative improvements which await the final action of governing boards.

Machine tool dealers report the demand in Pittsburg territory is not as active as in the western districts where companies appear more aggressive in adding to their present plant capacities. This is partially explained in the fact that a number of plants in this territory made material improvements just about the time of the beginning of the recent depression. There is a fair amount of replacement business going.

The Job Iron & Steel Co., Ashland, Ky., has entered the market for a considerable lot of mill equipment which, it is planned, will be an important part of an extension of capacity now in contemplation. The current inquiry asks for prices on four hot mills, two cold mills and two roughing mills. The improvements are designed to increase the company's sheet production.

The American Sheet & Tin Plate Co. is installing considerable equipment in its Humbert tin plate plant at Connellsville, Pa., which will resume operations as soon as it can be placed in readiness. It is expected that operations will be started within several weeks. Most of the machinery undergoing installation is being shipped from idle plants of the company and new purchases are not large.

The Wilkes Rolling Mill Co., Sharon, Pa., is getting its improved plant into operation for the manufacture of iron tin plate. The company has made some changes and installed considerable new equipment in its mill which enables its plant to turn out the finished material from the product of its puddling departments. As a maker of iron tin plate, the Wilkes Rolling Mill Co. takes its place among the very few interests engaged in iron tin plate manufacture in this country.

The Union Sheet & Tin Plate Co., Pittsburg, is making some improvements in the galvanizing department of its sheet plant at Hazelton, Pa.

M. P. Shantz, of Allentown, Pa., has been appointed receiver for the Traylor Engineering Co. by the United States district court in Philadelphia.

MANGANESE AND ITS EFFECT ON IRON AND STEEL

An Examination Into the History of Manganese and its Relations to Ferro-Metallurgy

By H. I. Coe, B.Sc.

The metal manganese was first isolated in 1774 by the chemist Scheele, who prepared it by heating a mixture of the dioxide and charcoal in a crucible. He describes it as having a fascicular and granular structure with a grayish-white color, and as being less fusible than cast-iron, and very difficult to file. Other chemists prepared and examined the impure metal, though Wollaston in 1834 was the first to detect the crystals of carbide of manganese so well shown in speigel. Pure manganese as prepared by modern processes is a white lustrous metal with a slightly reddish tint. Its atomic weight is 55 and specific gravity 8.0. It is very hard and brittle and melts at 1,245 degrees Cent., this temperature being only slightly less than that at which it volatizes appreciably, though it does not boil until 1,900 degrees Cent. It resembles iron, cobalt and nickel in most of its properties, though its exact place among the chemical elements has been the subject of much discussion.

Manganese forms alloys with most metals, the most important being those with iron, with which it alloys in all proportions, as shown in Fig. 1, which gives the freezing point curve as determined by Levin and Tammann.[1]

Several methods of preparing the metal in a practically pure state have been demonstrated, such as by the action of sodium, magnesium, etc., on its salts. Of recent years a

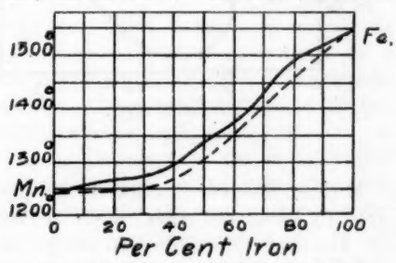

Fig. 1—Freezing Point Curve.

large quantity of manganese has been made by the Goldschmidt process which consists essentially of reducing manganese dioxide, MnO_2, by mixing it with aluminum powder and starting the reaction with a magnesium fuse. The process depends upon the great affinity of aluminum for oxygen, setting free the manganese. The product obtained contains about 99 per cent manganese.

Moissan[2], again, obtained carbon and silicon free manganese by reducing manganese dioxide with iron sulphide in the electric furnace, rapid reduction being essential to prevent absorption of carbon from the electrodes. Manganese as a pure metal is, however, of comparative unimportance, and it is when alloyed with iron that it finds an extensive application in metallurgy. Important experiments on these alloys were first performed by Mr. Robert Mushet[3] about the year 1830. He made alloys in the laboratory containing up to 30 per cent manganese; but their manufacture on a practical scale is due to Henderson[4] of Glasgow, who gave the results of his experiments during the discussion of Mr. Gautier's paper on the "Uses of Ferro-Manganese" at the meeting of the Iron and Steel Institute in 1876.

Manganese in Nature.

It appears also that the metallurgical world was indebted to the remarkable foresight shown by Sir Henry Bessemer in the manufacture of rich alloys of manganese and iron, as but for his judgment in recognizing their value it is probable that Mr. Henderson would not have pursued his experiments.

Manganese occurs in nature, firstly, in the form of pure ores, chiefly oxides of which pyrolusite (MnO_2) is the best known; this and hausmanite are black in color, while the carbonate, rhodochroisite has a characteristic pink appearance. Secondly, as a constituent of other ores, chiefly manganiferous iron ores. These are spathic ores containing carbonate of manganese, or brown ores (probably derived from the former) containing pyrolusite. Manganese ores are obtained chiefly from the Caucasus, India, Brazil, Spain, and Chili, where altogether nearly two million tons are mined annually[5]. A deposit of mixed carbonate and silicate of manganese has been mined in Carnarvon, while again franklinite, a well-

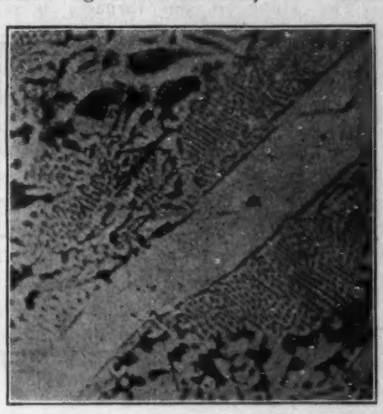

Fig. 2—Crystalline Band of Double Carbide of Iron and Manganese.

known complex manganiferous ore, is smelted in New Jersey.

Preparation of the Alloys.

The alloys of manganese and iron that are manufactured are divided into two classes:—

(a) Speigeleisen or "mirror iron", when the manganese does not exceed 25 per cent. This has a characteristic platey, crystalline structure, hence the name "mirror iron".

(b) Ferro - manganese, when the manganese exceeds 25 per cent. This alloy is a hard crystalline material which does not, however, present the large cleavage planes characteristic of speigel. Speigel and ferro-manganese are produced by smelting the ores in small water-jacketed blast furnaces with a heavy burden, that is, a high proportion of fuel, sometimes amounting to 50 hundred-weights per ton of metal produced so as to obtain the highest temperature possible. A difficulty lies in the regulation of the blast temperature, which should be about 650 degrees Cent.; if it be higher, silicon will be reduced. In practice it is found that to prevent the slag becoming "dry" and infusible it must be kept very basic and should be green and vitreous.

The silica should be low and the slags should be basic without con-

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*Paper read before the Staffordshire Iron and Steel Institute Nov. 13, 1909.

[1]Levin and Tammann: Zeitschrift fur anorganische Chemie. 1905, Vol. 47.
Journal of the Society of Chemical Industry. 1905, p. 1,112.

[2]Moissan: Comptes Rendes. Vol. 16, p. 1,429.

[3]Mushet: Papers on Iron and Steel, p. 750.

[4]Henderson: Iron and Steel Manufacture. Kohn, p. 109.

[5]Journal of the Iron and Steel Institute. 1909, Vol. I., p. 696.

taining a large excess of lime. A notable quantity of manganese is lost by volatilization as well as that found in the slag; to produce 20 per cent speigel there will be 8 per cent manganese in the slag, while for 80 per cent ferro, 20 per cent manganese will go into the slag; in short, a highly basic slag, plenty of fuel and slow working are essential for the production of these alloys.

The lining of the furnaces is rapidly worn away, and in Westphalia carbon bricks are used since they resist corrosion better. When the metal is tapped, the blast must be stopped since the ferro-manganese oxidizes very readily.

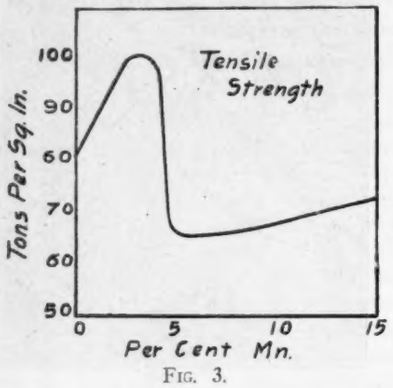

FIG. 3.

Typical analyses give the following compositions:

	Fe.	Mn.	C.	Si.	S.	P.
Speigeleisen	81.87	12.5	5.9	0.1	0.14	0.15
Ferro-Manganese	4.0	87.9	6.5	1.5	—	0.29

It will be noted that the carbon is high, and that it is about the same in speigel as in ferro. The presence of manganese allows the iron to retain more carbon in combination. The carbon exists as a double carbide, varying in constitution from Fe_3C_4 Mn_3C in 80 per cent ferro to $4Fe_2C$ Mn_3C with less than 18 per cent manganese in the metal[6]; the accompanying miero-photograph, Fig. 2, shows a well-defined crystal of this double carbide.

In addition to this combined carbon it has been shown that these alloys have the property of dissolving a further amount of carbon, besides taking up large quantities of silicon and aluminum with the formation of double carbides.[7]

Of late years, ferro-manganese has been extensively manufactured in the electric furnace, more especially abroad. The Simon electric furnace process[8], which has been successfully applied in France, is essentially electrolytic. It consists in the electrolysis of a mass of fused calcium fluoride in which oxide of manganese has been previously dissolved. In this respect it bears a resemblance to the aluminum extraction processes of Héroult and Hall. Careful temperature is here, as in many other furnace processes, an essential feature of the operation, metallic manganese being volatile at a temperature but slightly in excess of its melting point.

A raw charge having the following composition is fed into the furnace:

Oxide of manganese	6 parts.
Silica	6 "
Lime	3 "
Magnetic oxide of iron	0.6 "

Under the thermo-electric action of the furnace the oxide of manganese is reduced, partly by electrolysis and partly by the chemical combination of the oxygen with the carbon of the electrodes. In order to prevent an excess of carbon entering the reduced metal the anode is protected by a sheet of manganese slag. The results are found to be most favorable when carbon is mixed with the oxide before its introduction into the furnace. The product has the following composition:

Mn	84 per cent.
Fe	8.3 "
Si	0.2 "
C	7.1 "
P	0.1 "

It may be added that should silicon and phosphorus be present in the bath as impurities, they combine with the fluorine of the calcium fluoride as the result of secondary reactions, and pass off as volatile by-products. The above process as carried out in practice involves a power of expenditure of 3,500 kilowatt hours per ton of ferro-manganese produced, each furnace having a capacity of at least 150 kilowatts, and a terminal electro motive force of 30 volts. Of this only 7.5 volts are required to effect electrolysis, the balance being necessary to insure the passage of the current required to maintain the general high temperature of the mass. The cost of production, with cheap water power available, is £8 per ton.

As in many cases it is desirable to produce carbon free ferro-manganese for use in the manufacture of manganese steel, several methods for decarburization of ordinary ferro-manganese have been suggested, such as cementation in oxide or in lime, and also bessemerization, but so far without any degree of success.

In the experiments of Roberts and Wraight[9] there was a small reduction of the carbon, but in each case this reduction was obtained at the expense of silicification of the material.

Fusing with oxide and carbonate of manganese has, however, resulted in a considerable reduction of the carbon, as the following analyses show:

	Mn.	Fe.	Si.	C.
Original metal	80.5	12	.4	6.7
Melted for three hours....	73.7	22.7	.36	2.7

This decarburization is probably due to the reaction between the manganese carbide and the iron oxide formed indirectly from the manganese dioxide.

Uses of Manganese Iron Carbon Alloys.

The chief uses of speigel and ferro-manganese are for the removal of oxygen from molten steel, and also for effecting recarburization.

Sir Henry Bessemer found, in his early experiments on the production of mild steel by blowing air through molten pig iron, that when all the carbon was removed, oxygen was taken up, and the quality of the metal was thus injured. It became hot short, and in extreme cases both hot and cold short. Robert Mushet heard Bessemer's account of the experiments read, and he stated that he saw the process could not succeed exactly in the form described, and he suggested the use of manganese to remove the difficulty.

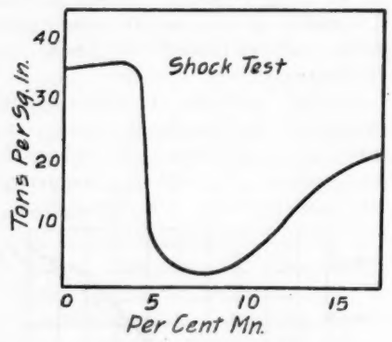

FIG. 4.

Mushet, however, allowed his patents to lapse, and later, when he was in financial difficulties, Bessemer allowed him an income of £300 a year.

It is certain that the use of manganese as speigeleisen, and later as ferro-manganese, rendered possible the production of mild steel.

At the end of the Bessemer blow, the carbon having been reduced to 0.10 per cent or less, the converter

[6]Arnold, and Read: Journal of the Chemical Society. Aug., 1894. Vol. 55.
Carnot and Goutal: Annales des Mines. Vol. 18, 1900, p. 263.
[7]Moissan: The Electric Furnace.

[8]Simon's Electric Furnace: Journal of the Society of Chemical Industry, 1890, Vol. IX.

[9]Roberts and Wraight: Journal on the Iron and Steel Institute, 1906, Vol. II., p. 229.

is turned down, and from 5 to 10 per cent of speigel, sometimes previously melted in a cupola, is run in, causing a burst of flame, due to the reaction of the carbon in the speigel on the oxygen in the blow metal. The manganese is evenly distributed throughout the mass on pouring into the ladle.

When speigel is added after the blow to the basic Bessemer converter, it is found that phosphorus is to some small extent reduced from

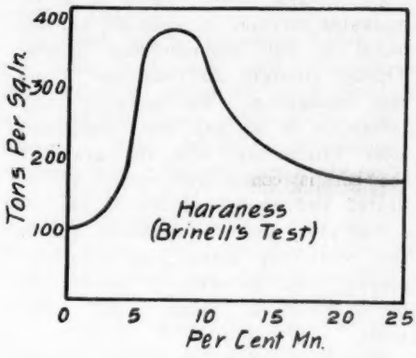

FIG. 5.

the slag, so that as much as possible, therefore, of the slag must be previously poured off; the action is generally held to be due to the carbon monoxide given off and to the reducing action of the manganese itself. Owing to the tendency to over-oxidation during the after blow of this process, the amount of speigel required is large, and in many cases a decrease in the amount is attained by adding gray hematite iron to the charge.

It may be noted that in Sweden very large quantities of steel are made by the Bessemer process without any addition of speigel, the metal being blown to just the required carbon content and retaining 0.2—0.35 per cent Mn at the end of the blow.

In the open hearth process it is usual to run the carbon down to a little below the required percentage, and then a calculated amount of ferro-manganese, plus one-half in excess, is thrown into the metal before or during tapping, to bring the carbon up to the required amount; about 0.4 per cent manganese is left in the metal, and only a portion of the carbon and manganese added as ferro is subsequently found in the steel, supporting the view of the presence of oxygen in the mass of the molten metal.

The beneficial influence of manganese may be considered as due to its property of indirectly removing red shortness owing:

(a) To its great affinity for oxygen.

(b) To its facilitating the separation of slag mechanically mixed, and

(c) To its power of neutralizing to some extent the influence of sulphur.

Owing to its affinity for oxygen it reduces oxide of iron, and thus destroys a cause of ebullition during solidification with the resultant formation of blowholes; it facilitates the separation of mechanically mixed slag by forming a very fluid and readily separating double silicate.

Its effect in neutralizing sulphur will be dealt with later.

The addition of ferro-manganese or speigeleisen, instead of metallic manganese is supported on the grounds of cheapness.

For high carbon steels, speigel is used, since, while containing a small proportion of manganese, the carbon is about as high as that in ferro, with four times the amount of manganese.

The large amount of speigel that has to be added explains why it is often first melted in a cupola, since the quantity required to give the right percentage of manganese and carbon would often be more than the bath of molten metal would be able to melt, especially in the case of cold heats.

Manganese in Pig and Cast Iron.

Manganese occurs in pig iron in amounts varying up to 1 per cent, or more rarely above 2 per cent. It may be assumed that under ordinary conditions one-half of the manganese in the ore enters the iron, and the other half the slag. Its presence even in small quantities favors the elimination of sulphur and hardens the metal. Like sulphur, manganese has a strong tendency to convert graphitic carbon into combined carbon, so that although it enables iron to take up more carbon, sometimes amounting to 5½ per cent, the pig may not be gray. Since it hardens the casting, the ordinary foundryman does not favor an iron containing much manganese, and the average pig produced in the United States contains from 0.5 to 0.75 per cent manganese, so that not much attention is paid to this element—not as much as should be, for owing to its affinity for sulphur it serves in melting in the cupola to carry off that element, which would otherwise enter or remain in the iron. It is well known to some foundrymen that a cupola iron loses its manganese by combination with sulphur, the sulphide passing off into the slag.

Furthermore the best "softeners" ever made, some of the Scotch brands, habitually run over 1 per cent manganese, and this fact in itself is a sound reason for the use of this element. The presence of manganese up to 1 per cent or more is desirable in low silicon iron for making chilled castings, or castings required to be hard and strong; so that if soft or gray castings are required the iron must be low in manganese.[10]

In pig, for the production of steel by the Bessemer process, manganese is a somewhat important element; it increases the temperature of the blow, tends to remove sulphur, increases the fluidity of the slag, and protects the bath from over-oxidation; the greater part of the manganese is removed in the first few minutes of the blow. It, however, exerts a cutting action on the lining and shortens the life of the tuyeres and bottom; again, in the Siemens and the crucible steel processes, the linings or pots are very much attacked in the presence of much manganese.

Manganese in Steel.

The effect of small quantities of manganese on the ductility and elasticity varies very considerably with the percentage of carbon in the steel; its influence being much more marked in the case of high than of low carbon steels.

Harbord states that for mild steel and rail steel the less manganese it contains above that required to insure sound ingots and freedom from red shortness the better, and provided that good pig iron, free from sulphur, be used, and reasonable care

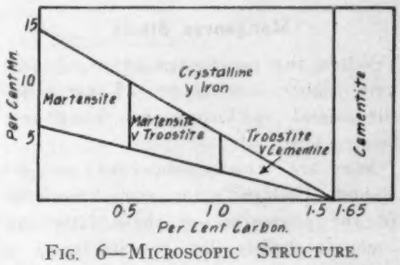

FIG. 6—MICROSCOPIC STRUCTURE.

taken during the manufacture, there should not be the slightest difficulty in obtaining these results with 0.4—0.5 per cent manganese in the finished product, at all events for mild steel made in Siemen's furnace. In the case of rails it is difficult to get as low an amount as this, but it should not exceed 0.8 per cent.

The general tendency of manganese is to increase the tensile strength

[10]Johnson: Journal of the Iron and Steel Institute. 1898, Vol. II., p. 206.

and somewhat reduce the ductility, but neither of these effects is nearly as great as has often been maintained, and a slight increase in the carbon, or other constituents accompanying the manganese, is very often responsible for a greater part of the increase, and for the varying results obtained.

Manganese up to 1 per cent in mild steels for most purposes such as axles, etc., will not reduce the ductility so much as to induce brittleness to any dangerous extent, but in the case of mild steel, required for boiler plates, for bridge or other structural purposes, an increase in manganese has a very distinct hardening effect, and above 0.6 per cent begins to be dangerous.

The influence on high carbon steels is marked; one peculiar fact noticed in ordinary Sheffield tool steel is that when it contains 0.75 per cent carbon, with manganese about 0.6 or 0.7 per cent, the material is very liable to water cracking, so that high-class tool steels rarely contain more than 0.3 Mn. In general, the increase of the tensile strength by small quantities of manganese decreases as the percentage of this element rises; for instance, the first 0.15 per cent increases the tenacity by 3,600 pounds, while an increase from 0.5 to 0.65 per cent only adds 1,000 pounds to its strength[11].

According to Professor Howe[12] the effect of small quantities of manganese 1—1.5 per cent on steel is not nearly as bad as has been made out by metallurgists in the past; in fact, although the steel is slightly more brittle it is more easily forged.

Manganese Steels.

When the percentage of manganese gets higher, say above 2.5 per cent, the metal is known as manganese steel.

We are chiefly indebted to Sir Robert Hadfield[13] for our knowledge of the properties of these latter alloys, as before his investigations it was generally believed that steel became brittle and comparatively worthless when the manganese exceeded 2.75 per cent. Hadfield, however, found that when the manganese was raised to over 7 per cent the result was a practically new metal which up to 20 per cent possesses extraordinary strength and toughness.

[11]Webster: Journal of the Iron and Steel Institute. 1894. Vol. I., p. 331.
Deshayes: Classement et emploi des aciers. p. 151.
[12]Howe: "Steel."
[13]Hadfield: Journal of the Iron and Steel Institute. 1888, Vol. II., p. 41.
Proceedings of the Institution of Civil Engineers. Vol. 93, Part 3, p. 1.

Manganese steel may be manufactured by any of the ordinary steel-making processes, the basis, that is the material to which the ferro-manganese is added, being preferably very mild steel.

About 0.5 per cent of the manganese is oxidized. The crucible method of making this steel is not suitable, on account of the cutting power or the slagging of the pots by the manganese. There is a strong smell of sulphur dioxide when molten, but the sulphur is not reduced below 0.06 per cent. The steel produced is not so liable to honey-combs as ordinary steel, and the addition of silicon is unnecessary; it is very fluid, and can be run into very thin sections, but cools more rapidly than ordinary steel, and its contraction is decidedly greater.

FIG. 7—COLD BLAST WHITE IRON SHOWING CRYSTALLITE OF MANGANESE SULPHIDE. (THE WHITE CROSS.)

This latter fact explains the reason of its piping and settling so much, both in the ingot and in the casting.

There is considerable difficulty in making carbon-free manganese steel, since as previously noted silica pots are eaten through, while carbon is taken up from plumbago crucibles. Arnold[14] has succeeded in making practically carbon-free manganese iron alloys by using special crucibles made of a mixture of Stourbridge and other fire-clays. Pure Swedish bar-iron and carbon-free manganese made by the Goldschmidt process were melted in separate pots, precautions being taken to get them melted at the same moment. The metals were then mixed and cast.

[14]Arnold and Knowles: Journal of the Iron and Steel Institute. Vol. I., p. 106.

A short account of Hadfield's original paper might be given here.

Manganese steels:—*Manganese* 2.5—7.5 per cent. Carbon low 0.25—0.5 per cent.

A. *As Cast.* Extremely brittle. Tensile strength 4 tons per square inch. The remarkable weakness in the cast state is no doubt intensified by the peculiar crystallization. Between 4 and 6 per cent the alloys can be powdered with a hammer, though they are quite ductile when hot.

B. *Forged State.* There is a remarkable increase in strength but the metal is still commercially useless. Tensile strength 25 tons and 3 per cent elongation. The peculiar crystallization of the cast state disappears after hammering, and the grain of the bar is coarse and open. If reheated and cooled quickly in the air a fine close grain is obtained, and in this state the metal has been employed with satisfactory results for boring cutters, razors, and other tools.

Manganese 7.5 per cent and upward.

A. *As Cast.* An increase in strength occurs, and with about 10 per cent a 2½ inch square bar will bend considerably before breaking, but samples above 14 per cent are not so tough.

From 10—14 per cent an extraordinary gain in strength is obtained by "water toughening," i. e., chilling from 1,000—1,100 degrees Cent. in cold water. Such chilling would cause brittleness or cracking in ordinary steel. After water toughening, notwithstanding their hardness and stiffness, pieces 12 inches by 1½ inches by ⅜ inch bent double cold just like a piece of mild forged steel, the apparently contradictory qualities of hardness and toughness being here obtained. Such a material is used in America for couplings.

A singular point about the fracture of the 9 per cent material may be mentioned. When water-toughened, although the strength of the material is greatly increased, this is certainly not owing to structural change as the pronounced form of crystallization of the ingot is not to the eye in any way altered.

It will be understood how difficult it is to offer any satisfactory explanation of the gain in strength by this treatment, which in ordinary steel would be so detrimental.

B. *Forged State.* The marked crystallization is destroyed and the strength and ductibility are increased.

	Tensile strength. Per sq. in.*	Elongation on 8 in. per cent.
13.75 per cent Mn.....	65 tons	50
14.27 per cent Mn.....	69 tons	46

*Tons of 2240 pounds.

Above 14 per cent, the steel loses its strength. The hardness is greatest at 6 per cent (no tool will touch it), decreases to 10 per cent and rises again to 22 per cent. Yet, strange to say, these pieces can be indented by a hammer, so that they are in a way soft. It would be interesting to compare the hardness by the three standard methods—the slerometer, the scleroscope, and Brinnell's test.

A die 1 inch high and 8 inches in diameter, containing 10 per cent manganese, shortened ¼ inch under a load of 100 tons.

In short, steels containing below .9 per cent manganese are comparatively useless owing to their hardness and brittleness, while above this amount they possess increasing strength and toughness up to 14 per cent, the hardness only slightly diminishing. Naturally brittle, only moderately strong, and with a low elastic limit, these steels are made extremely tough, very strong, and, under impact, stiff, by quenching from whiteness, the higher the temperature the better, which neither cracks small bars nor changes its fracture, which, before forging, was strongly crystalline, nor raises its elastic limit.

It is so hard that it can barely be machined, but is softened by sudden quenching from dull redness. Heating and quenching, instead of increasing, seem to lower the elastic limit, already unfortunately low, and it is possible that it may thus injure rather than benefit the metal for many important purposes. Under stress, manganese steels act very differently from wrought iron and carbon steels. Manganese steel, with a tensile strength of 56 tons, takes a permanent set at 15 tons, so that in this respect it is but little better than mild steel, with a tenacity of only 27 tons.

As the elastic limit and modulus of elasticity of this steel are low, while its permanent set seems to increase at normal rate under increasing load, its stiffness under shock is somewhat puzzling. Manganese steels weld badly, if at all.

The study of the actual effect of high percentage manganese on steel presents some difficulty, as it is hard to keep the carbon low, which otherwise greatly influences the properties.

Latterly these steels have formed the subject of a research by Professor Guillet[15], who gives the following diagrams to illustrate their mechanical properties (Figs. 3, 4 and 5). The carbon in these steels was 0.8 per cent.

[15]Guillet: Journal of the Iron and Steel Institute, 1906, Vol. II., p. 6.

Test bars stretch like brass, nearly uniformly, and do not "neck" like iron.

Structure and Physical Properties.

The microscopic structure of the different steels containing varying amounts of carbon is shown in Fig. 6.

The transformation of the pearlite to martensite, and of the latter to gamma iron, does not take place suddenly, but through a series of transition stages; the pearlite differs from ordinary pearlite in being more broken up and granular. The fracture of manganese steel ingots is strongly crystalline, and is not changed even by strongly heating and quenching, but is however broken up by forging as observed by Hadfield. Up to 7 per cent, the structure is coarsely acicular, the size of the crystals becoming much smaller up to 12 per cent, after which the structure again becomes coarsely crystalline, and resembles that of coarse cast iron. The useful manganese steels lie in the crystalline area; those in the martensite area are hard and brittle.

FIG. 8—MILD STEEL SHOWING LENS-SHAPED PIECE OF MANGANESE SULPHIDE; SHAPE DUE TO ROLLING.

It may be observed that manganese steels alloyed with nickel have their properties altered; thus a steel with 5 per cent manganese and 14 per cent nickel is workable, although these proportions of the elements separately would give a useless steel.

The absence of recalescence points in high manganese steel is remarkable, and suggests the occurrence of stable gamma iron at ordinary temperatures. With 3 per cent manganese Ar_2 occurs at 400 degrees Cent., while with 7 per cent it is below the ordinary temperature, thus yielding an explanation of the hardness of high manganese steels; the softening of manganese steel on quenching may perhaps be due to the formation of the soft Austenitic modification.

The electrical resistance of Hadfield's manganese steel is eight times that of ordinary steel, and thirty times that of copper.

Notwithstanding its high proportion of iron, the most magnetic metal known, it is almost entirely non-magnetic; wrought iron is 8,000 times more susceptible to magnetism than manganese steel.

An interesting research has been conducted by Hadfield[16] on this point concerning magnetism, and the results show that manganese steel, a practically non-magnetic material, can be rendered considerably magnetic, yet by further treating the same material the previous non-magnetic qualities can be restored at will.

Cemented manganese steels become magnetic, and this property has been proved not to be due to increase in carbon, but probably to alteration in the condition of the carbon present. After being kept several months, the magnetic properties were lost, showing them to be but feeble. On heating, forging, and quenching the magnetic qualities were lost, while long annealing alone was sufficient to confor magnetic properties, showing cementation as not being the only cause. Manganese steel, decarbonized by long annealing in an oxidizing material, until the carbon was reduced to 0.06 per cent was shown to become magnetic and its magnetism persisted even after forging and quenching. There was no oxidation of the manganese in this experiment.

Magnetic qualities may thus be conferred on manganese steel either by:—

(a) Cementation.

(b) Continuous heating for a long time without change of carbon.

(c) Decarbonization by methods such as are used for the production of malleable cast-iron.

Hadfield advances an explanation of these phenomena by suggesting that the exact form of the carbon in the steel has been destroyed; that the carbon in the combined form as double carbide has been converted into something the equivalent of the temper carbon of Ledebur. If this is so, it is another demonstration of the very important part that carbon plays in steels, and shows that other elements are to some extent of secondary importance.

The difficulty of decomposing this double carbide explains the detrimen-

[16]Hadfield: Journal of the Iron and Steel Institute, 1894, Vol. I., p. 156.

tal effect manganese has on cast iron used for malleable castings, when present in large quantities.

Manganese and Sulphur in Iron.

An important effect of manganese is that of counteracting sulphur to a very great extent.

Arnold[17] has published a very interesting research on this subject, and the following account is a *precis* of that research.

Three steels are compared containing practically the same amount of sulphur but varying quantities of manganese.

Fig.	C.	Si.	Mn.	S.	P.	Remarks.
2.	0.39	0.34	0.10	0.42	0.04	Ingot cracked hopelessly after 3rd blow of hammer.
7.	0.35	0.32	0.45	0.47	0.04	Ingot cracked hopelessly after 10th blow.
8.	0.46	0.37	1.07	0.54	0.04	Ingot forged well.

The foregoing table shows in sharp relief the fatal effect of sulphide of iron on steel, compared with the small effect produced by sulphide of manganese. At the same time, manganese sulphide is certainly harmful; even when 1 per cent manganese is present, high sulphur has a considerable effect for the bad on the steel, as Fig. 8 shows when mechanically compared with a similar steel containing only 0.02 per cent S.

		Max. stress	Elongation*	Reduction of Area*
0.54* S.	As rolled	40 tons	16	24
0.02* S.		52 "	25	50

* Per cent.

The pale brown sulphide of iron forms cell walls, fusible at a bright red heat, and so renders the mass hopelessly red short; furthermore, the cell walls of sulphide eutectic in solidifying at about 950 degrees Cent. contract from the cells of iron they envelop and leave the mass cut in pieces by innumerable cracks; thus iron containing about 1 per cent of sulphur has a tenacity of only 2½ tons per square inch, and owing to contraction cavities, a specific gravity of only 7.69.

On the other hand, sulphide of manganese segregates at high temperatures into globular masses, upon which the main mass of the iron and steel contracts, and, therefore, instead of contraction fissures, there remains something equivalent to minute blow-holes filled with sulphide of manganese. So tightly is this manganese sulphide held by the contraction of the mass upon it, that it seldom falls out during polishing, like the loose sulphide of iron.

It is stated that sulphide of manganese fuses at about 1,100 degrees Cent., but from experiments performed in the laboratory of the Birmingham University by D. M. Levy, there is no sign of complete fusion at 1,500—1,600 degrees Cent., the powdered sulphide being but slightly fritted.

It is true that there was some alteration in the sulphur content, but this was hardly sufficient to account for the increase above 1,100 degrees Cent. It is, however, quite evident that the so-called sulphide of manganese in steel is fully plastic at a rolling heat, since the relatively long streaks of this constituent in the high sulphur steel mentioned show no signs of crushing or splitting. It is more than probable, however, that this dove-gray manganese sulphide is not pure, but contains a certain amount of sulphide of iron.

The principle of mass action may be advanced to support this opinion. Should the manganese sulphide be impure, it would account possibly for this constituent being semi-fluid at a rolling heat, say 1,000 degrees Cent.

As indicating the approximate solidifying point of this manganese sulphide constituent, a micrograph of a cold blast white iron is given, Fig. 7, which shows a well-defined cross of manganese sulphide. From its shape, it must have crystallized out prior to the mass of the metal, indicating it to have a solidifying point somewhat above that of white iron, or, say, 1,200—1,300 degrees Cent.

Summing up the effect of sulphur on steel, we find that:—

1. Iron sulphide, Fe S, is deadly, whilst manganese sulphide is comparatively harmless.

2. That the above facts are due to the fusibility of iron sulphide, to its high contraction co-efficient, and to the tendency of iron sulphide to form cell walls, surrounding cells of ferrite, while manganese sulphide is much less fusible, and collects into globules.

Professor Arnold confirms a fact noted in reference to Professor Guillet's research, that in steels containing a fair proportion of manganese the pearlite is more broken up and granular.

Details and micrographs are given in the same paper of a mild steel containing 0.4 per cent carbon and 1.04 per cent manganese.

From its micro-section, and judged by the relative pearlite and ferrite areas this steel appears to contain about 0.7 per cent carbon; these appearances are due to the fact that manganese powerfully retards the segregation of the ferrite and the lamination of the pearlite, phenomena accounting for the relatively high tenacity of steel fairly high (about 1 per cent) in manganese.

A remarkable change in microstructure is brought about by very slowly cooling the same steel, the constituents gathering together in comparatively large masses.

Such micrographic change amply accounts for the great difference in the mechanical properties of this steel after cooling.

	Max. Stress	Elongation per cent.	Reduction of Area per cent.
As rolled	52 tons	25	50
Annealed	43 "	25	25

Uses of Manganese Steel.

The use of manganese steel is limited by the extreme difficulty of machining even the softened variety. Again, the low elastic limit militates against its extensive application.

It is cast for use as car wheels, tramway points, stamp dies, etc., as it wears excellently owing to its hardness; the life of manganese steel rails is 4½—6 times that of high carbon open hearth steel rails, while their cost is little more than three times as much. The wear is not uniform, but decreases with the age of the rail. It is important to avoid over-heating, say, above 1,000 degrees Cent. The tensile strength of commercial manganese steel rail is about 60 tons, with an elongation of 30—40 per cent, while the elastic limit is between 30 and 34 tons; in America these rails are rolled by a special process, the Potter process.

The electrical resistance of manganese steel fits it for use in resistance coils, while on account of its low magnetic susceptibility it is employed for the bed plates of dynamos.

Owing to its low crushing strength it has too low a resistance to penetration for use as an armor plate, while also such large pieces are liable to crack on quenching.

In the preparation of this paper the author has quoted largely from original papers found in the Journal of the Iron and Steel Institute; one is very much indebted to metallurgists such as Sir Robert Hadfield, Professor Arnold, and Professor Guillet for information on manganese iron alloys.

The author also begs to express his thanks to Professor Turner for the kind interest he has taken in the

[17] Arnold and Waterhouse: Journal of the Iron and Steel Institute. 1903. Vol. I., p. 136.

preparation of this paper, and again to Mr. Hudson for the use of micro-photographs.

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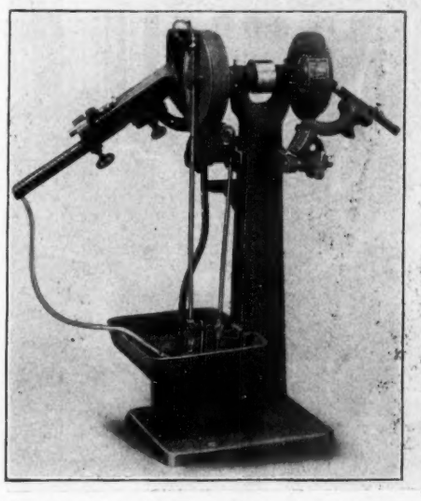
NEW SMALL DRILL GRINDER.

In the issue of THE IRON TRADE REVIEW for Nov. 4, was presented a description, with photograph, of a surface grinder which the Wilmarth & Morman Co., of Grand Rapids, Mich., recently placed on the market, and which was also fitted for grinding drills in all sizes. This company now is offering to the trade a new grinder, designed to remove a possible objection to the other style of grinder in that same difficulty might be experienced in handling the smaller sizes of drills in a holder of sufficient size to hold the larger drills, and including the valuable wet-grinding feature.

The cut presented herewith shows the company's type, "WPL," on which drills from 5/8-inch down to No. 60 can be ground, but its greatest efficiency will be found in grinding drills not over 1/2-inch in diameter. For wet-grinding the larger drills, the other type of machine, previously referred to, is recommended.



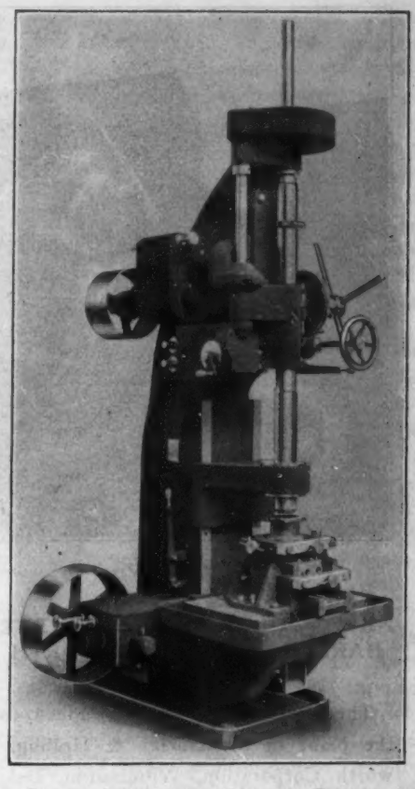
WILMARTH & MORMAN CO.'S NEW DRILL GRINDER.

A fine-grade emery wheel is provided for the small drills, and it will be noted that two operators may work at the same time without interfering with each other.

Both holders embody the new Yankee construction, which automatically locates each size of drill in the proper position for grinding. As with all the Yankee drill grinders, the desired clearance for drilling hard steel or soft metal is secured by an easy adjustment. The normal clearance, however, is maintained continuously, for drills of various sizes, without any thought or adjustment on the part of the operator. In any case, only one, or, at the most, two adjustments are required.

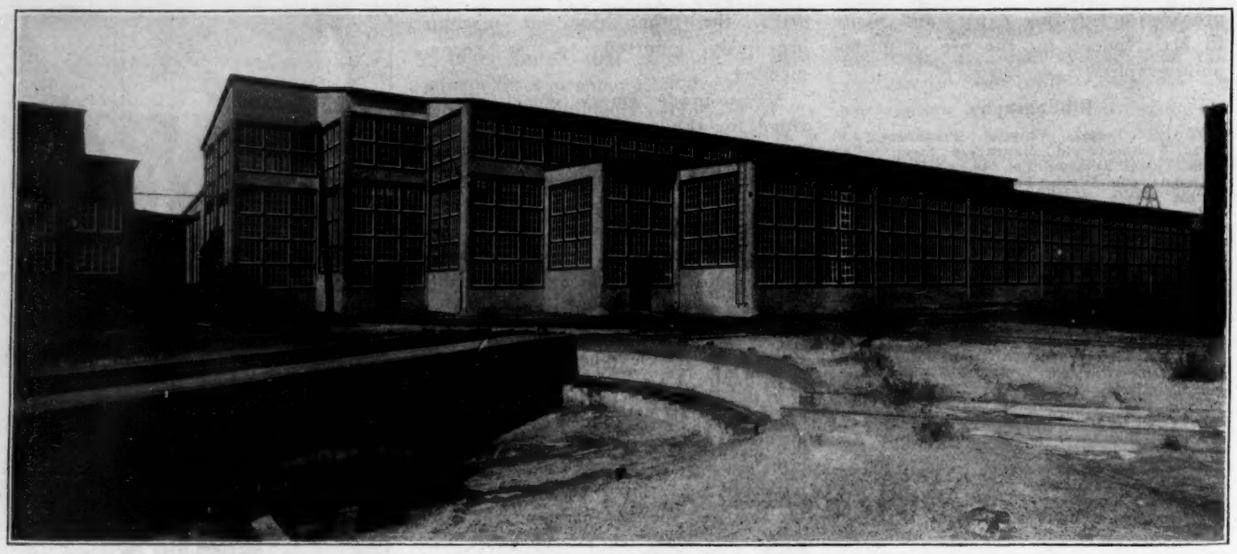
A MACHINE FOR BORING AUTOMOBILE CYLINDERS.

The illustration herewith shows the smallest machine of the line built by Baker Bros., Toledo, Ohio, for boring automobile cylinders, which includes five sizes and types of single, double and four-spindle machines. The one shown herewith is designed for boring short cylinders and similar work, and is rated for work 3¾ inches diameter, 8 inches deep, and while these are the dimensions for which the work is best suited, it will easily bore larger diameters because of the large power factor employed. The illustration shows the machine with a fixture for a unique type of open-end cylinder. The support for the boring bar is deserving of particular attention, and consists of a very substantial bracket, vertically adjustable on the front of the machine and carrying a bronze bushing fitted in a tapered seat, allowing a very close adjustment to the hardened boring bar. With this arrangement the maximum size bar that will enter in cylinder is always provided, and the cutter is very rigidly supported and therefore will not follow the cored hole. As may be seen, the machine is massively built, and it is claimed, adapted for high speeds and feeds. The makers say that all shafts are ground and bearings bronze bushed, and that the majority of the gears are of steel running in an oil bath and that many of these are hardened. The capacity of the machine is 12 inches from spindle centers to the face of column. There are eight speeds obtainable through sliding change gears and twelve changes of gear feeds. The machine is driven by single belt, direct from the line shaft if required. The weight of the machine is stated to be 3,500 pounds and the floor space required is 3 feet 6 inches by 3 feet 6 inches. The method of handling work with these machines is to set them up in gangs of three or four units so that the cylinders may progress from one spindle to the next without interruption for rough boring, straight boring and reaming, or they may be laid aside for seasoning between any two of the operations. Where cylinders are reamed, they are roughed under the first spindle, straightened under the second, and reamed under the third. When but two cuts are taken before grinding, they are roughed in the first and third spindles and straightened under the second and fourth. The builders have been intimately associated with the boring of automobile cylinders since the early stage of their manufacture, and say that their extensive experience is freely at the service of those interested.



BAKER AUTOMOBILE CYLINDER BORING MACHINE.

During the first six months of 1909 American-made mining machinery to the value of $606,872 was exported to Natal.



An Exterior View of New Car Shops; Harlan & Hollingsworth Corporation, Wilmington, Del.

NEW CAR SHOPS FOR THE HARLAN & HOLLINGSWORTH CORPORATION.

There have been recently added to the plant of the Harlan & Hollingsworth Corporation, Wilmington, Del., new shops which have been expressly designed with a view to the building of steel underframe and steel passenger cars. The shop in plan is of a somewhat irregular shape, about 150 x 180 feet and is built throughout with reinforced concrete and steel, with concrete floor. We are able to present herewith views which give a very good idea not only of the external appearance but also of the internal arrangement. It will be seen that the lighting is exceptionally good. The artificial lighting also exceptionally good, and is provided by Cooper-Hewitt lights. The tracks are amply served by overhead trolleys and it

An Interior View of the New Harlan & Hollingsworth Shops, Showing Lighting System, Track and Trolley Service, Etc.

will be seen that there are three of these over each building track.

The equipment includes the latest designs of air and electric tools for riveting, chipping, drilling, bending, etc., of the shapes and plates entering into the construction of steel underframes and cars. There is ample storage for oil fuel, with which the shops are supplied, and also auxiliary air reservoirs for use in connection with air tools.

The Harlan & Hollinsgorth Co. has long been known as a builder of passenger cars, the construction of which is now tending strongly towards the use of steel; hence the necessity for additional equipment.

A STUDY OF RUST-PREVENTING PAINTS FOR METAL STRUCTURES[1]

By Emil Camerman.[2]

A report presented to the Zurich Congress by Mr. Valat, chief engineer, French Eastern company, and my own experiments on several paints, which have recently been made public, tend to show that inferior results are obtained with the following rust-preventing paints:

Paints prepared with a mixture of linseed oil and of essence of turpentine.

Paints prepared with tar or its derivatives.

Zinc white paints (enamels).

Paints containing sulphate of barium.

Paints in which manganese resinate forms the siccative.

Zinc white paints (enamels).

Lithopone colors (mixtures of zinc sulphide and barium sulphate).

Pure linseed oil paint which develops blisters.

These inferior results will be understood, when we consider the following difficulties which the rust-preventing coating should meet.

1. The coating may be wanting in thickness from the very moment of its application, or at least after having dried.

It will be conceded that, other things being equal, a thin coating will not resist so long the incessant bombardment by the particles of atmospheric dust and will not remain so impervious, as a thick coating.

Thus a paint containing 50 per cent of essence of turpentine is very fluid. It spreads to a much finer film than a paint prepared with boiled linseed oil, which forms a relatively viscous product. The former coating moreover is further reduced in thickness by the volatization of the whole of its essence of turpentine, which constitutes half of its volume. The great influence of mixtures which comprise such volatile constituents is evident.

Almost all the tar paints, which generally consist of some pitchy, more or less dry material, dissolved in an essential oil, may be classed with this series of defective paints. The essential oil evaporates and the paint dries in this way, which necessarily leaves the final coating much weakened.

2. The coating may gradually diminish in thickness. In addition to their solvents the tar paints themselves slowly and gradually give off their volatile constituents, resulting in hollow spaces, shrinkages, and consequently thin, weak spots, and even fissures.

3. The coating, although satisfying the conditions as to thickness, may be wanting in elasticity. This is again the case with preparations of dry pitch and essential oils.

The dried linseed oil on the contrary forms a soft, elastic pellicle which has often been compared to leather.

4. The coating may lack hardness and not be able to resist the impact of the dust particles, that is to say, it may not wear well. The two qualities, elasticity and hardness, may at first thought appear contradictory. But the two qualities are quite compatible if we mingle a powder of hard grains with a paste of a soft and elastic material. This consideration quite justifies the addition of powders or pigments to the bodies; we need not restrict ourselves to pure linseed oil, for instance.

5. The coating may be liable to develop cracks and fissures in the continuity of the surface. Such accidents may be ascribed to two chief causes: (a) The powdered material mixed with the body of the paint does not sufficiently adhere to the latter and separates from it under the inevitable contractions and expansions. This will be the case of certain inert materials: sulphate of barium, sand in mixtures with ochre, and others; (b) The body may be decomposed. This occurrence is almost always due to polymerization or depolymerization processes. Owing to the latter reaction certain oils give rise to the formation of simple hydrocarbons which act as solvents for the remaining substances. The color then turns pitchy; the simple hydrocarbons are slowly volatilized, and hollow spaces and cracks make their appearance.

6. The powdered substance must be intimately united with the liquid mass of the body. Chemical combination between the components forms the most perfect bond, which will best resist any tendency to disintegration under the influence of expansions and contraction; the lead oxide may be quoted as a noteworthy example.

7. Neither the body, nor the powdered substance should be liable to atmospheric corrosion by the oxygen and particularly by the furnace gases from large industrial works; zinc preparations, zinc oxide, zinc sulphide and the lithophones in particular leave much to be desired in this respect.

Of all the liquids which serve as paint body, linseed oil appears to us to be best. It spreads in relatively thick films; instead of diminishing in thickness by volatilization, it gains in mass by absorption of oxygen, and it is scarcely liable to deperdition. Judiciously applied it never turns pitchy, nor is it inclined to crack and moreover it remains sufficiently elastic for years, at any rate.

Linseed oil can be obtained in different grades, as crude linseed oil; old linseed oil; as linseed oil merely boiled in air, as *standolie de Hollande;* as thickened linseed oil boiled with litharge or with manganese peroxide.

The crude linseed oil, when well clarified, is relatively light in color and readily taken up. It is, however, a little more fluid than the boiled oil and spreads in slightly thinner films. During its oxidation it loses from 6 to 8 per cent of the decomposition products of glycerine; for this reason it forms blisters when applied in the hot, or especially as long as hot.

The old stored linseed oil is very clear, loses little by oxidation, dries pretty rapidly and is superior to the just described raw oil. But it rarely comes on the market.

Linseed oil, simply air-bottled (kettle-boiled) differs little from the two grades mentioned and need not further be dwelt upon.

[1]Presented at Fifth Congress International Association for Testing Materials, Copenhagen, 1909.

[2]Belgian State Railways, Brussels.

The oil which is designated *standolie de Hollande* is a clear oil of considerable thickness; but it dries very badly and can only be used as an additive in the proportion of 20 or 30 per cent.

Linseed oil, boiled with litharge or manganese peroxide, is a comparatively thick fluid, which does not diminish in mass while drying, does not throw up blisters, and which requires only a very small quantity of artificial siccative; but it is of a very dark color. We recommend this last mentioned grade of oil for all rust-preventing paints, when the shade of color is not of importance, and when the quality of the oil can be controlled. The oil must be absolutely free from manganese resinate, because this product is subject to depolymerization, to turn pitchy and to crack.

Pigments.

We will now turn to the diverse powders or pigments which are mixed with the linseed oil. Experience shall be our guide. My own experiments have demonstrated that lead, white mixed with inert powders such as sulphate of barium, in the proportions of 25, 50, 75 per cent of barium sulphate, possessed a rust-preventing capacity which was almost directly proportional to the percentage of lead white. In other words, in panels of iron, painted under the same conditions and examined at certain intervals, spots made their appearance whose intensity was approximately proportional to the percentage of the barium sulphate present in the paint.

Lead white paints, paints containing iron oxide (iron minium), minium (lead oxides), or graphite have resisted best. Zinc oxide is far inferior to these pigments; zinc sulphide and lithopone (mixtures of zinc sulphide and barium sulphate) are worthless.

In conclusion, my opinion is that we should, in the actual state of our knowledge, impose the following conditions concerning paints which are to protect iron structures from rust:

The paint should consist of iron minium, prepared with boiled linseed oil under exclusion of essence of turpentine.

The determination of the amount of siccative to be used may be left to the superintendent in charge.

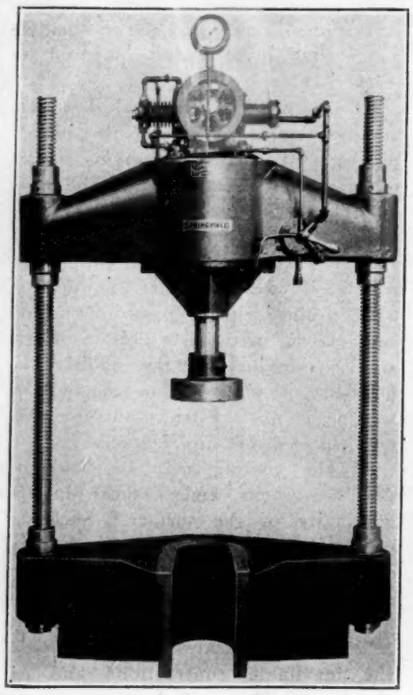
So far as my own experience goes, equally good results are realized when graphite is substituted for the iron minium. The graphite must also be reduced to an impalpable powder and should contain at least 55 per cent of carbon.

The quantity of powdered pigment which should be mixed with the linseed oil may be left to the judgment of the painters.

The minium of iron shall be ground to an impalpable powder; the fineness will, in any case, be sufficient when the powder stirred with water and applied to a glass plate in the state of a fluid paste, does not allow any grains to be felt when rubbed with the finger. The minium should contain at least 75 per cent of ferric oxide and be free from sulphur.

The boiled linseed oil should be obtained from a clear pure oil, boiled with litharge or manganese peroxide, until its specific gravity attains at least the figure 0.939.

As regards the siccative, the superintendent should make a trial, three or four days before the commencement of the work, by painting a panel with the prescribed composition, but without using a siccative. The proportions will have to be adapted to the suitable period of drying. That period will depend upon the temperature, the necessity of keeping off the dust which may be troublesome at the time, the urgency of applying the second coating, and other features. It will be borne in mind that paints which contain the minimum amount of siccative are the best.



SPRINGFIELD PNEUMATIC PRESS.

AN IMPROVED PNEUMATIC PRESS.

The pneumatic press is designed for saving labor in making the numerous driving fits which come up in machine shop practice. Its design permits of its being located as most convenient and regardless of considerations as to line shafts or other sources of power. For the same reason there is no power maintenance charge while the press is not in use. The machine illustrated herewith, which is built by the Springfield Machine Tool Co., Springfield, O., is designed to exert a pressure of 20 tons. It consists, as will be seen, of two main castings which are adjustably spaced by the threaded rods on either side. This arrangement allows of a considerable latitude in the length of work to be dealt with. The upper casting contains the working cylinder and carries an automatic pump, the function of which is to increase the air pressure up to about three times the initial pressure when desired. The controlling valve shown to the right hand of the upper frame is all that is necessary for the complete operation of the machine. One position of this control lever raises the piston, the next position admits the initial pressure above the piston, and should this pressure prove insufficient, the third position of the control automatically starts the pump, which gradually increases the pressure to the desired point. The valve permits of a very sensitive control of the piston movement, which adds to the convenience and economical working of the machine. The design of the piston is one which has been found by experience to be most satisfactory for holding an air pressure of 225 pounds. On the lower end of the piston rod is carried a shoe faced with soft metal to avoid injuring finished work. The pressure gage which is furnished indicates exactly the pressure being applied to the work. Some of the leading features of the machine are as follows: Distance between upright screws, 38½ inches; maximum distance between piston and base, 42 inches; diameter of piston, 15 inches; stroke, 8 inches; maximum pressure, 20 tons with an initial air pressure of 80 pounds; net weight of machine, 2,000 pounds; floor space required, 24 x 48 inches.

The Southern Iron & Steel Co. has contracted for drilling a number of test holes on the company's iron ore properties at Rising Fawn, Ga., with a view to further development.

A NEW FLOATING REAMER HOLDER.

A floating reamer holder for which a number of advantages are claimed, particularly in connection with turret head boring and turning mills, has been brought out by the Colburn Machine Tool Co., Franklin, Pa. Any make or style of reamer, whether solid or shell, adjustable or non-adjustable, can be used; a Morse shank being the only essential, and the holder can be used on any make or style of vertical boring mill having a flat sided turret.

Nearly all users of chucking machinery appreciate the necessity of using a floating reamer in the final operation, because it is well known that when a reamer is held rigidly it is liable to produce a taper hole or ream the hole too large. With any machine, such as a boring mill for instance, having a turret with a cross movement, the floating reamer is indispensable, as a center stop is depended upon to bring the turret holes into alignment with the main spindle, and unless special care be exercised the operator will not bring the turret back to exactly the same position every time, even with the positive stop. The pressure of the hand on the crank handle may vary enough to change the exact alignment of turret and spindle a few thousandths of an inch, and reaming a hole with a rigid fixed reamer would, under these conditions, probably produce a hole tapered or enlarged to a greater or less amount.

This can be avoided by so holding the reamer that its axis is always maintained parallel to the center of hole, but at the same time so arranged that it may be slightly self-adjusting radially, so that the hole and reamer will automatically maintain perfect alignment with each other. This is what is said to be accomplished by the use of the device shown in accompanying illustrations of which Fig. 1 is a view complete and Fig. 2 the parts disassembled.

Referring to the line drawing, Fig. 3, plate *A* may be made to fit the face of the turret on any boring mill, and is bolted to same by four filister head screws. Sleeve *C* is held in plate *A* by means of two steel pins *B* which are tight in plate *A* and made to fit freely in bayonet grooves *D*. Reamer holder *E* floats on sleeve *C*, the floating motion being obtained through the four steel pins *G* extending into driving ring *F*. Two of the pins are tight in the holder *E* and two in sleeve *C*. The faces of sleeve *C*, driving ring *F*, and reamer holder *E* are held tight against each other by means of spring *H*, which insures the reamer being held perfectly true. Spring *H* is adjusted by means of nut *I* which is turned with a spanner wrench furnished with each holder.

It will be seen that plate *A* is the only part of the device that has to be made specially to fit different makes of boring mills. The manufacturers announce that they are prepared to furnish these holders with plate to fit any make of turret head mill.

The holders are made in two sizes, the No. 1 having a No. 4 Morse taper socket and capable of holding reamers up to 3 inches in diameter, and the No. 2, having a No. 5 Morse taper socket and capable of holding reamers up to 4 inches in diameter.

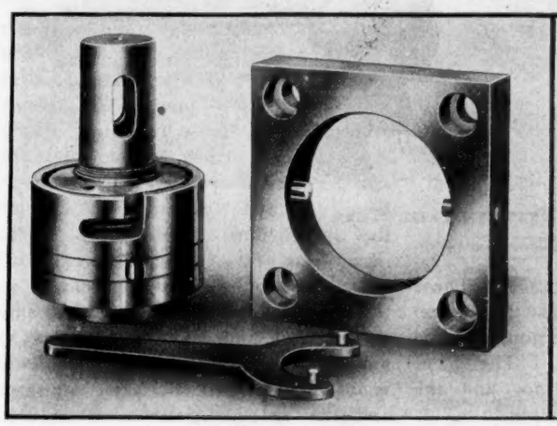


FIG. 1—REAMER HOLDER COMPLETE.

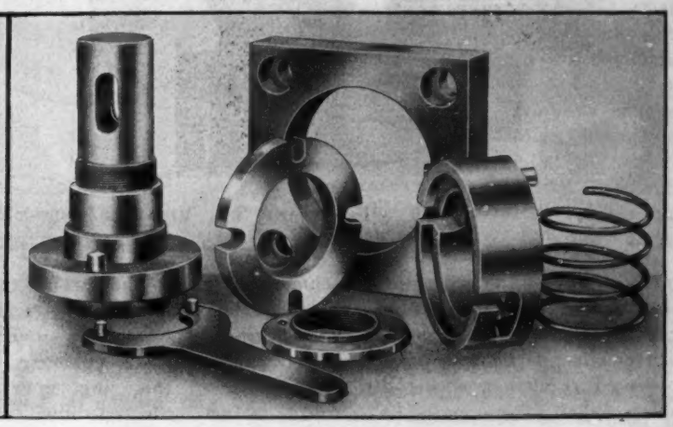


FIG. 2—PARTS OF REAMER HOLDER.

A WATER TURBINE FOR LOW HEADS.

The Pelton Water Wheel Co. has been known for a number of years in the manufacture of tangential jet type water wheels for hydro-electric and other power plants. These wheels are generally employed where high heads, that is to say, 400 feet and upwards, are available. The number of such sites is, however, relatively few, and attention has therefore been directed towards the improvement of others with lower heads, which in turn for direct connection to electric generators demand a wheel specially designed for low and medium pressures and high speeds. The Pelton Co. has therefore taken up the manufacture of the Pelton-Francis tur-

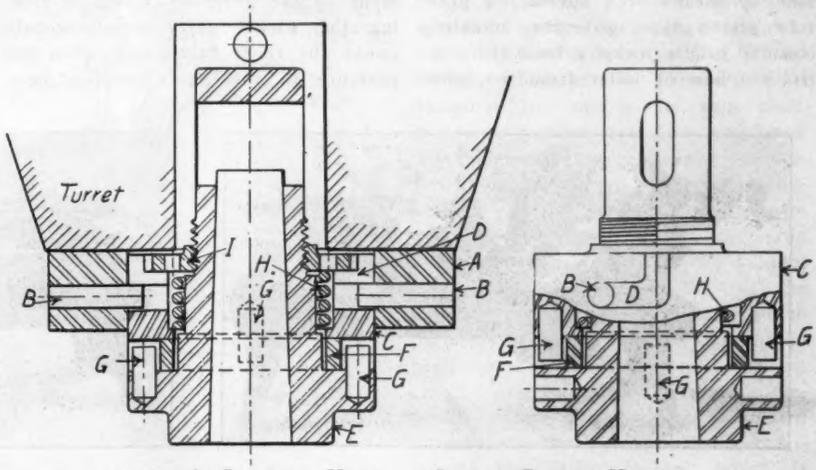
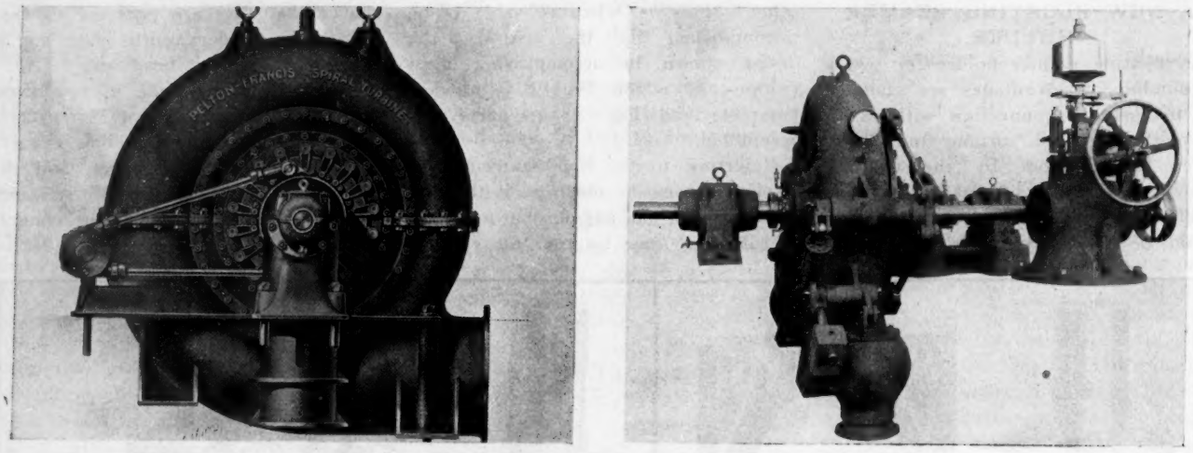


FIG. 3—SECTIONAL VIEWS OF COLBURN REAMER HOLDER.



FRONT AND SIDE VIEWS OF PELTON-FRANCIS WATER TURBINE.

bine, which, in addition to the chief features of the Francis design, is claimed to embody a number of improvements, particularly in the matter of speed regulation, wicket gate mechanism, relief valves, etc.

These turbines, which are patterned largely after well known European designs, consist in part of a spiral casing or water chamber, so designed as to impart constant velocity to the water as it enters the turbine runner, resulting in a high efficiency.

The runner is of phosphor bronze and is of the radial inward flow reaction type, of either single or double discharge variety, as required by the operating conditions. Draft tubes are also employed so as to utilize the extreme height of fall.

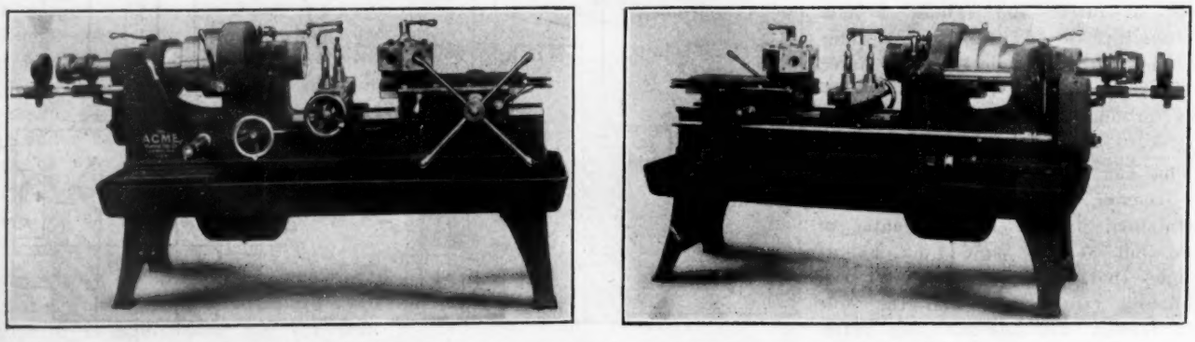
One of the chief difficulties which has always confronted turbine designers has been to obtain a wheel that would not only be efficient under different gate openings, but be susceptible of the closest possible speed regulations. This is said to have been accomplished in the Pelton turbine by means of a special oil pressure piston type governor actuating balanced bronze wicket gates which control the flow of water from the spiral casing into the turbine runner. These balanced gates are attached to a steel ring to which the governor connecting rods are connected. The position of this ring, governor and the wicket gate operating mechanism, is clearly shown in the illustration.

To minimize the danger of injury to the pipe line from the sudden arresting of the flow of water in the pipe when load changes occur, the turbine wheel is equipped with a special relief valve which is actuated solely by the governor in closing the turbine gates. The ordinary relief valve depends upon a rise of pressure in the penstock for their operation. This pressure rise must be sufficient to overcome the balancing mechanism, usually steel springs, of the relief valve, and usually causes a great spouting velocity of the water which tends to complicate and render difficult the work of the governor in maintaining satisfactory speed regulation. In the Pelton-Francis relief valve this defect is overcome through the control of the relief valve movement by the governor, which in closing the wicket gates simultaneously opens the relief valve, and when the pressure in the pipe line has been sufficiently relieved, slowly closes it, this operation being controlled by an oil dash pot. With this type of valve the pressure at the turbine is maintained almost perfectly uniform and the speed regulation is accordingly improved.

The illustrations show the general design of a Pelton-Francis turbine suitable for direct connection to an electric generator, and of which many are in operation in Mexico. In the Sultepec light and power plant there are two 800 horsepower Pelton-Francis turbines operating at 900 revolutions per minute, with a head of 340 feet, the pipe line being 42 inches in diameter and 950 feet in length. The manufacturers claim for these turbines an efficiency of nearly 85 per cent, at full load, and that the Pelton governors maintain the speed regulation within 6 per cent of the normal, when the entire load of 800 horsepower is instantly dropped from each machine. The company operates works in San Francisco and New York.

THE ACME TURRET LATHE AND SCREW MACHINE.

The illustrations herewith show a new screw machine and turret lathe



BACK AND FRONT VIEWS OF ACME TURRET LATHE AND SCREW MACHINE.

recently brought out by the Acme Machine Tool Co., Cincinnati, O., and which, it is claimed, meets a demand for a powerful machine for use with high speed steel. As will be seen, the head stock is cast integral with the bed and is provided with a three-step cone and friction back gears so arranged that the spindle can be stopped by shifting the operating lever to the middle position. The spindle bearings are of the ring oiling type and large in size, and the end thrust is taken by front bearing. The automatic chuck is forged solid with the nose of the spindle, which tends to reduce the overhang and extend the support of the collet. The chuck and stock feeding lever, and in fact all the operating levers, are placed within convenient reach of the operator. The turret is of the hexagonal form, provided with the usual holes, with binder bushings. A hole through the turret stem, the same size as those in the turret faces, allows of passing long work through the turret. The power feed is of the geared type, with four changes obtained by the movement of a lever placed over the rear spindle bearing. A graduated dial and positive stops are provided for the cross slide, and a longitudinal adjustment is also provided by means of the handwheel and screw shown. The screw is protected from chips and dirt by being encased in steel tubes. In designing this machine, the possibility of the later addition of power feed to turret and cut-off has been kept in mind. A stock feed can also be attached when desired, without altering spindle. It will be noted that the chip pan is of unusual depth, which tends to lengthen the interval between cleanings. A master collet is furnished with each machine, together with a set of bushings to take stock up to the largest capacity of the machine.

AN IMPROVED GOGGLE VALVE.

Those who are familiar with steel mill practice know something of the goggle, or spectacle valve. It is one of the simplest and least expensive in construction for use in gas mains. The old form of valve, however, is difficult and uncertain of operation, there being no means of holding the flanges in relative positions, or separating them while the valve is being operated. It is therefore limited in its field of practical usefulness and

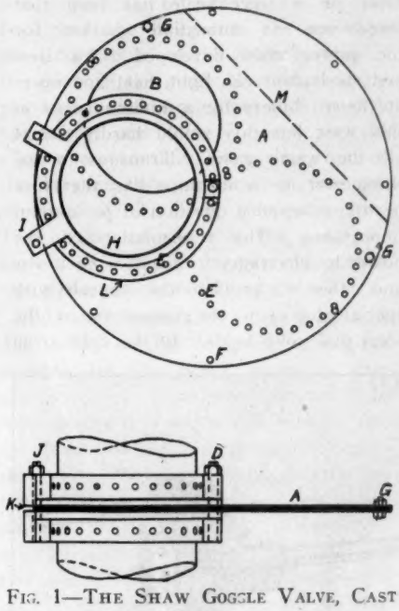


FIG. 1—THE SHAW GOGGLE VALVE, CAST FLANGES.

cannot very well be used in any but horizontal pipes.

The improved form of valve designed by L. Shaw, 7631 Bond avenue, Chicago, and illustrated herewith, is very little more complicated or expensive in construction. It may be noted here that the valve plate may be made thinner than the old form, due to the greater width of metal at the weak point at the sides of the opening B, Fig. 1, cut in the plate A. The valves may be placed in mains at any angle and operated with a greater degree of ease and rapidity, which makes them more generally applicable and acceptable from the standpoint of practical operation and safety.

Fig. 1 shows the valve installed between cast faced flanges and in a position between open and closed. A is a circular valve plate, in which the opening B is cut for the passage of the gas and C is the blank side of the plate. Plate A revolves on

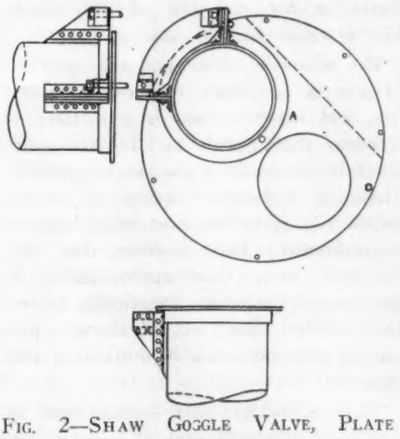


FIG. 2—SHAW GOGGLE VALVE, PLATE FLANGES.

the king bolt D. EE are the bolt holes for bolting the valve in open or closed position. F are holes for the insertion of hooks for turning the valve. GG are stops. H are the flanges between which the valve A is bolted, which carry lugs I extending beyond the plate A. J are main control bolts which hold the flanges in relative position while the valve is being turned. K are openings for the insertion of wedges to separate the flanges when the valve is to be turned. L shows the uncut plate passing between the flanges and preventing excessive leakage of gas.

In cases where valves are very large, the plate may be cut on one side, as indicated by the dotted line M.

Fig. 2 shows a rigidly designed arrangement of built-up steel brackets, which are secured to rolled steel or cast flanges, when lugs are not provided on the flanges, as in Fig. 1. The brackets may be secured in place with tap bolts when riveting cannot conveniently be done. The arrangement is the same in every way as described for Fig. 1.

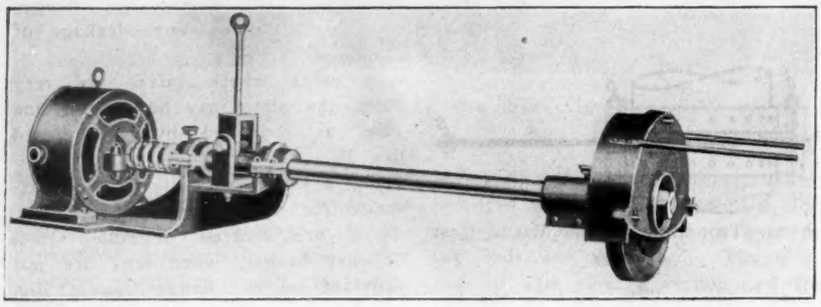
To operate the valve, the small bolts are first removed from around the flanges. The main control bolts J are then slacked off two or three turns and wedges driven between the lugs at K. The valve is then easily turned until it comes up against the stop G. The wedges are then removed, the bolts tightened and the small bolts around the flanges replaced.

A number of these valves have been installed at the South Works of Illinois Steel Co., at South Chicago, Ill.

A PORTABLE SWINGING MOTOR DRIVEN GRINDER.

The illustration herewith shows what is believed to be a novelty in swinging motor-driven wheel grinders, which has been designed by G. A. Hassel, superintendent of the Pittsburg Steel Foundry, for use in its own plant, where a number are now employed. The machine is suspended by the vertical eye bar shown, from any convenient point overhead, such as beam or roof truss, crane hook, etc., and may be carried at any convenient height above the floor to suit the work operated upon, and for which purpose it will be readily seen an ordinary chain block would be an added convenience. The 5-horsepower dust proof motor shown mounted on the frame is direct coupled to the 24-inch wheel, which is protected by a safety shield of cast

steel. The two handles shown attached to this shield provide a convenient grip for the operator, who is enabled to swing the wheel about at will within a radius of about eight feet. It will be readily seen that the amount of work which a device of this sort can perform is very great, and its portability and the absence of belts add greatly to its convenience. The entire frame is made of cast steel, of heavy section, and the machine should be capable of withstanding a great deal of severe usage.



HASSEL PORTABLE SWINGING MOTOR GRINDER.

A BLAST FURNACE GAS PLANT.

BY A. S. ATKINSON.

The utilization of blast furnace gases for the generation of power in the iron and steel districts is a matter of economy and efficiency that enters more largely into the industry every year. The construction of large blast furnace gas units at Gary by the United States Steel Corporation is an indication of the importance attached to this form of power generation, and while the utilization of the waste gases of blast furnaces is not at all new, sufficient progress has been made in using gas that has always been wasted to prove that the by-product thus developed is an item of considerable worth.

The chief feature in this development is the use of the gas in engines for driving electric generators, and the fact is clearly demonstrated that the electric power can thus be produced much cheaper than in a steam plant. The increasing use of electric motors for individual machines in iron and steel plants makes it important that this power should be obtained at as reasonable a cost as possible. Under proper conditions one horsepower-year can be delivered by gas engines operating on blast furnace gas for a little less than $18. This figure includes no charge for the gas, as only waste gases are burnt, but it does include the charge for cleaning the blast furnace gas.

One of the difficulties of utilizing blast furnace gas for power development on a large scale has been that there was no immediate market for the power thus developed. An iron and steel plant can light, heat and operate its machinery for a minimum cost in this way, but this would hardly utilize all the waste gases. Transmission of the power to a distance has therefore been considered a question of paramount importance. The transmission of the power by electricity to neighboring towns and cities is a problem that appeals with special force to the operators in the steel and coke fields. In the coke oven fields, practically half, if not all of the gas is wasted, as the demand for the power is small, but these conditions are likely to exist only for a short time. A number of gas engines are now working in the Pennsylvania coke regions, and supplying electricity to a number of shops and plants in the vicinity without any cost for the gas itself.

Waste of Gas in a Typical Plant.

In one of the new blast furnace plants situated in a favorable location for supplying outside power, the operations for the past year have fully justified the expectations in this respect. The plant consists of two 400-ton blast furnaces, requiring 1,500,000 pounds of coke per day. From this quantity of coke there is produced approximately 110,000,000 cubic feet of gas each 24 hours, or for each ton of iron about 137,000 cubic feet of gas.

The waste of this enormous quantiy of gas is a serious engineering problem, and its utilization is a matter of economy that appeals to all. Not quite all of this amount of gas can be utilized. There is a certain amount of waste on the top of the furnaces which cannot be reclaimed. This, however, does not represent more than approximately 5 per cent of the total. Practically, therefore, 130,000 cubic feet of the gas per ton of iron produced is utilized in the engines.

The quality of blast furnace gas is low compared with that of natural gas or city producer gas, but it averages about 90 British thermal units per cubic foot. This gives approximately 4,350,000 cubic feet per hour utilized with a total heating value of 391,500,000 thermal units.

The use of this enormous supply of gas is divided up into several departments. One part of the blast furnace gas is used for heating hot blast stoves, and another for running gas-blowing engines, the auxiliary machines, such as pumps, hoists, coke and ore-handling machinery, power transmission, air compressors, pig iron casting machinery, and for lighting the entire plant. Practically 50 per cent of the total is thus employed directly for different purposes in the plant itself. The other 50 per cent, by means of gas engines and electric generators, is used for transmission over a short line to a nearby manufacturing town, where it is used for a great variety of purposes.

Double-acting gas engines of large type on the four-cycle principle average 9,000 British thermal units per brake horsepower per hour at full load capacity. On this basis, if all the blast furnace gas of the plant was utilized in the engine, there would be generated 43,500 horsepower per hour. This practically means an available power from the waste gases of over 50 horsepower per ton of pig iron produced per 24 hours.

But the maximum output and efficiency cannot be entirely based upon such high estimates owing to the irregularity of the pig iron market, which frequently necessitates the banking of the furnaces for indeterminable periods But outside of this uncertainty the utilization of the blast furnace gas is a great stride in the direction of economy. If the furnace had to be banked for any considerable period on account of the dullness of the pig iron market there would be a distinct loss. It would not pay to run the gas plant simply to furnish power to other factories in a neighboring town in this way. It is this uncertainty which has made the iron and steel companies hesitate to take up the question of supplying surplus power to other concerns on an annual fixed charge for light and power.

Cost of Plant and Output.

In one instance an electric power plant of 10,000 brake horsepower capacity is installed, and the size of the units has been devised for the purpose of economy. There are six gas engines of 1,500 horsepower each, and one of 500 horsepower. The generators are of 800 kilowatts capacity each, which, when driven by the 1,500-horsepower gas

engines, give, with 25 per cent overload, about 1,000 kilowatts. The gas engines have really a maximum load capacity of 1,650 brake horsepower, and at such times the generators can carry 1,120 kilowatts. Thus the generators carry an ordinary overload of 25 per cent and a maximum overload of 40 per cent for short periods.

In the construction of the plant $35,000 was charged against the gas-cleaning equipment, $50,000 for the electrical equipment, and $425,000 for the gas engines and their equipments. The complete electrical equipment, including dynamos, exciters, switchboard and accessories, cost upward of $170,000.

Estimating the total output on a 12,000-horsepower basis, the cost of the installation per brake horsepower was about $62 or, with a total output of 83,000 kilowats, the cost per kilowatt is $90.

The operating cost of such a plant is one which calls for extended data and important study of details. As the economy of every such plant depends a good deal upon the kind of labor and system of operation, the results are variable. There are the fixed charges to consider, the cost of water for washing gas and cooling the engines, cost of oil and grease, repairs, fuel and wages of operators and attendants. The fixed charges include depreciation as well as interest on the investment. The depreciation varies greatly for the different departments. While 4 or 5 per cent on the buildings is a fair allowance for depreciation, at least 10 per cent is allowed for the gas-cleaning plant.

The cost of the fuel is practically nothing, as the gases are waste, but if such cost is allowed, the price of each horsepower is found to be extremely low. Without including the cost of the fuel, the production of one brake horsepower per year when the plant is running under full load is about $17.80.

The question of designing blast furnace gas plants of suitable size and capacity is one that has occupied the attention of engineers for some time, and the gains made in practice are of great value. The question of cleaning the waste gases and the proper size of this cleaning plant present many difficult problems. The initial cost of the gas-cleaning plant is no considerable item, and its depreciation is also of importance. Recent improvements in this work have cut down the cost of operation and reduced the depreciation to more moderate figures.

Conditions Necessary to Success.

The quality of blast furnace gas also differs considerably in different localities according to the nature of the fuel, and the design of the cylinders must correspond to the heating value of the gas. In the many blast furnace gas plants scattered throughout the Pennsylvania coal and coke districts, the designs show considerable variety, but on the average they are made to use gas of 80 to 90 B. T. U. per cubic foot. The quality of some of the gas is as high as 100 B. T. U. per cubic foot, and some as low as 60 and even 50.

Half the success of these plants is due to the careful designing of engines suitable for the waste gases as they are produced from day to day. In some plants it is impossible to keep this gas from showing a considerable variation in quality, and consequently we hear of some apparent failures. But on the whole the blast furnace gas plants have proved efficient and economical, and their increasing use justifies the belief that they will soon be utilizing the greater part of the gases which are now wasted at many blast furnaces.

The question of direct connecting electrical generators to blast furnace gas engines for the production of electrical energy is one that appeals to the iron and steel manufacturers. This power is being utilized more and more extensively, and the simplicity of control enables workmen to economize in time and piecework. The saving of power is also considerable. The driving of pumps by electrical energy is so efficient and economical that this practice is becoming very common. The immediate cutting off of power costs when the pump is idle is an important item when we consider the variable work of the pumps in an average plant.

The blast furnace gas has also practically eliminated the cost of lighting the works. The electrical power generated in this way for lighting the shops and yards costs practically nothing, except interest on the investment and wages and repairs, when the fuel is eliminated. One plant which installed a small blast furnace unit for lighting its extensive shops estimates the cost over the old system of lighting as about 10 per cent. Now another unit is being installed for operating the pumps, air compressors and minor machinery. This is generally the method followed by large concerns in utilizing blast furnace gas engines. An experimental unit of moderate dimensions is first installed for lighting purposes, and when this proves successful another is put in to drive some of the minor machinery. In time the plant is equipped with enough gas engines to operate practically all the machinery. Few of them, however, have got to the point where they utilize all of the waste gases, for after producing all the power required for the use of the plant they hesitate about entering the market for sale of power.

The Producer as a Solution.

This, however, is undoubtedly the next step which will be taken up in a general way. In a rough way it may be stated that about half the waste gases of the average blast furnace plant will suffice to light the works and generate sufficient power to run all the operating machinery. The other 50 per cent of gas is wasted. The problem is to find an economical and satisfactory way to utilize this other 50 per cent. There is the question of running uninterruptedly all the year around when power is sold on contract which must be considered. Few blast furnace plants are so situated that they would care to take such a contract. If light and power are supplied to towns or cities or manufacturing plants, the service must be continuous and not dependent upon the pig iron market.

The solution of this problem is one that concerns the iron, steel and coke plants so much that extensive investigations of the subject have been made within the past year to determine whether the objection could not be overcome by having an auxiliary unit in the shape of a producer gas plant for operation when the pig iron market is dull and the blast furnaces banked. The initial cost of such an auxiliary installation would have to be added to the total investment, and this would naturally increase the relative cost per horsepower in the whole plant. Such a producer plant would have to be built on such a large scale that it would represent a very important item in the investment. The question of storing the blast furnace gas for intermittent use is practically out of the question, and the solution is one that cannot easily be determined. But the best engineering practice hopefully believes that the matter may yet be worked out so satisfactorily that the surplus power generated from the waste gases can be economically disposed of.

The Bray department of the American Sheet & Tin Plate Co., at South Sharon, Pa., resumed operating Nov. 22, after an idleness of two years.

Announcement is made by Takata & Co. that they have removed their offices to suite 350-52-54-87 the Hudson Terminal building, 50 Church street, New York city.

RAILWAY BUILDING

In Various Countries Engages Exporters' Attention.

Washington, D. C., Nov. 27.

Railway development in many different countries promises to engage the attention of manufacturers and exporters throughout this country during the coming year. Advices regarding the activities in different parts of the world are coming to the officials of the bureau of manufacture.

It is announced that the Argentine government will, within the next few years, construct about 3,000 miles of railway. It is said that with the exception of tie material, practically everything to be used in the construction of these roads, including rails, locomotives, brake fittings, cars and telegraphic material, must be imported into the country.

Information is brought to the bureau that a Belgian firm has received an order from China for 50 cars for the Tientsin railway, and that an order for 700 cars for Argentina has been apportioned among three Belgian firms.

EXTENDING HARBOR LINES FOR MARYLAND STEEL.

A hearing will be held Dec. 1, at Baltimore, by the resident United States engineer to consider the application of the Maryland Steel Co. for an extension of the harbor lines along side its property fronting on Humphreys creek, at Sparrows Point. It is understood that the company intends filling in along the creek for some distance, using the refuse from the plant to fill in the dumping ground.

NEW MALLEABLE PLANT AT WATERLOO, IA.

The Waterloo Malleable Iron Works, Waterloo, Ia., whose incorporation was recently noted, advises that it is capitalized at $100,000, and is an additional plant that will be operated in conjunction with the Worcester Pressed Steel Pulley Co., of which D. G. Langland is vice president, and James H. Roberts & Co., of which Mr. Langland is president. Mr. Langland is also president of the new Waterloo malleable company. The Roberts company will carry complete stocks of transmission materials made at the Waterloo plant, as well as the output of the Worcester Pressed Steel Co., of which it is exclusive agents. This pulley is patented and is said to be a superior steel article. The pulley company is allied with the Pressed Steel company, which has a splendidly equipped pressed steel plant. Contracts have been awarded and construction work started on the Waterloo plant, which, it is expected, will be complete and operating by March 1, 1910. The buildings will be of modern concrete construction and will contain about 40,000 square feet of floor space. The malleable and gray iron foundries will be equipped with modern molding machinery, and the machine shop with automatic machinery specially adapted to the work.

ARRANGE TO REMOVE DRILL PLANT TO MOLINE.

Arrangements have been completed by the Moline Plow Co., Moline, Ill., for the removal to that city of the Monitor Drill Co., formerly of Minneapolis. The Moline Plow Co. advises that this removal explains the recent increase of $1,000,000 in its capital stock. The main building in which the Minneapolis concern will be housed will be 80 x 1,009 feet, 200 feet of the extension to be of brick construction, one story to be used for storage. The second section, 150 feet long, will be of fireproof construction, one story, to be used as a blacksmith shop. Another building, 659 feet long, will be six stories high with basement, reinforced concrete and brick. North of the main building will be erected a foundry 200 x 250 feet, of steel construction, with tile roof, and absolutely fireproof. East of the foundry building a paint shop 80 x 150 feet, three stories and basement, will be built. The buildings are to be completed by September 1, next year, at which time the Monitor plant will be removed to Moline. The entire contract for new work has been awarded to A. C. Stouffer, who is still engaged in the construction of large additions to the company's auxiliary plants at Freeport, Ill.

OFFICIAL CHANGES.

E. Donaldson Clapp has been elected treasurer of the E. D. Clapp Mfg. Co., Auburn, N. Y., in place of F. A. Eldredge, resigned, and will remove to Auburn from Chicago, where he has been the company's western representative. Mr. Clapp is the grandson and namesake of Emerous D. Clapp, the founder of the company in 1864. William S. Lee, who completed his fortieth year with the company Oct. 29, and has been in charge of the coal department over 20 years, has been elected vice president, succeeding H. D. Titus, resigned, and secretary in place of Mr. Eldredge.

IMPROVEMENT IN CAR SUPPLY IN COKE REGION.

Some improvement in the car situation in the coke regions is reported by the Coke Producers' Association, which reviews conditions for the week ending Nov. 20 as follows:

Number of available coke ovens, 38,663.

Number active, 35,348 or 91.4 per cent.

Number idle, 3,315.

The number of ovens active shows an increase of 100 over the preceding week. The available ovens, a decrease of 111, due to dropping off at several plants that number, by reason of coal being worked out or ovens abandoned. The number of idle ovens was also reduced 211 as compared with the week before.

Shipments to Pittsburg and points west by way of the three railroads were 628 cars more than the preceding week.

The estimated production of coke for the week was 448,262 tons as compared with 446,953 tons the week before, a gain in production of 1,309 tons.

An improvement in car supply over what it has been for several weeks is noted. Other conditions are practically unchanged.

MUCH PLATE CONSTRUCTION.

The Sharon Boiler Works, Sharon, Pa., builder of the Wheeler vertical water tube boiler, is now erecting for the Mexican National Gas Co., Mexico City, Mex., two large gas generators and three large desulphurizing tanks. It is also completing a Mullen gas washer for the Stewart Iron Co., Sharon, Pa., and has completed erecting the seventh 400-horsepower Wheeler boiler for this same concern. It is also erecting an additional 400-horsepower Wheeler boiler for Joseph E. Thropp at Earleston stack, Earleston, Pa., as well as putting up 18 gas producers at the Lansingville plant of the Haselton Tube Co., near Youngstown, O.

PIG IRON PRODUCTION OF GERMANY.

During October the production of pig iron in Germany and Luxemburg was 1,113,763 tons, an increase of about 50,000 tons over the previous month. Its distribution was as follows: Foundry, 224,627 tons; Bessemer, 33,627 tons; Thomas pig iron, 707,131 tons; steel and spiegel iron, 99,139 tons; puddling iron 49,470 tons.

Steel rail exports from Great Britain to Argentine Republic during the first ten months of the year were in excess of 140,000 tons. Close to 90,000 were shipped to the British East Indies and 47,000 tons to Australia.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Banner Machine Co., Columbiana, O., $10,000; by F. H. Grove, C. D. Rymer, R. H. Grove, H. M. Hoover and C. M. Hoover.

The Fort Smith Stove Works, Fort Smith, Ark., $60,000; E. W. Samples, L. Kimball, John C. Gardner and others.

The Wayne Auto Axle Co., Fort Wayne; $100,000; by A. B. White, J. R. Keenan, H. C. Pequignot, H. E. Sprague and Edward White.

The Moore Bros. Foundry & Machine Co., Riverton, N. J.; $25,000; by Lorenzo H. Moore Sr.; Lorenzo H. Moore Jr. and Alfred Smith.

The Joseph Goldberger Iron Co., Cincinnati; $100,000; by Ben Given, Anthony B. Dunlap, John Brashears, A. P. Butterfield, J. P. Lindsay.

The Dayton Casting Co., Dayton, O.; $15,000; Joseph F. Westendorf, James S. Mitchell, John Westendorf, Oscar Schwagel and Clarence Westendorf.

The Rubber City Machine Co., Akron, O., $10,000; by George W. Bloodgood, H. M. Braden, J. N. Romweber, J. T. Swartz and A. C. Dick.

The Newbrook Co., New York City; machinery, tools, etc.; $10,000; John A. MacMartin, 259 Stratford road; John F. Brush, 16 Court street, both of Brooklyn; Harry C. Cook, Freeport, N. Y.

The Ronson Specialty Co., Newark, N. J.; special tools and appliances; automobilists' supplies, etc.; $150,000; by Louis V. Aronson, Jennie F. Hayes and Waldron M. Ward, all of Newark, N. J.

The Universal Crusher Co., Cedar Rapids, Ia.; stone crushers and machines; $50,000; by C. K. Welch. M. C. Kindelberger, L. E. Shrader, P. H. Bachman, Wheeling, W. Va.; and James Cameron, of New York City.

New Construction:—

W. H. Kneeland has purchased control of the Pioneer Iron Works, Olympia, Wash., and will enlarge and considerably improve the plant.

The Stewart Machinery Co., Winnipeg, Man., has applied for a permit to erect a four-story warehouse at an estimated cost of $30,000.

Lawrence Bros., Rock Falls, Ill., are completing repairs to their machine shop, which was badly damaged by fire several weeks ago.

The Lehigh Valley Railroad Co. is planning to build a machine shop at Coxton, Pa., of concrete, 80 x 200 feet. Work will be commenced in the late spring.

The Zimmerman Steel Co., Lone Tree, Ia., is building a steel foundry of steel and concrete blocks. The foundry will be ready for operating within two months.

The Malleable Iron Fittings Co., Branford, Conn., has awarded the contract for the construction of a foundry 135 x 155 feet, of brick and steel construction.

The Sharon Foundry Co. is making arrangements for the erection of a new open-hearth furnace at its plant at Wheatland, Pa. The improvement will double the melting capacity of the plant.

The Western Foundry Co. has taken out a permit to erect a one-story brick japanning and blacksmith shop, at 3634-3654 Kedzie avenue, Chicago, estimated to cost $4,800.

Messrs. Borg & Beck, Moline, Ill., advise respecting the removal of their machine shop from East Moline, that the building has been completed and the machinery purchased.

The La Follette blast furnace, La Follette, Tenn., which has been leased by the La Follette Iron Co., is to be equipped with a Baker-Newman rotary distributor of standard design, for double skip hoists.

The C. H. Besly Mfg. Co., Beloit, has completed plans for the addition of a third story to its concrete plant erected four years ago. The company manufactures a newly patented disc grinder and similar equipment.

The Co-operative Stove Works, Buffalo, will build a plant at Amherst street and the New York Central tracks, Black Rock, of brick and stone, two stories, 90 x 97 feet, at an estimated cost of $10,000.

The Nevada Ingot Iron Pipe Co., a part of the Ohio Corrugated Culvert Co., of Middletown, O., has been organized by the following; President, George E. Nisewonder, of Arcanum; vice president, H. B. Anderson, of Franklin; secretary, R. C. O'Neal, of Delaware; treasurer, T. L. Brewer, of Greenville; W. H. Johnson and William H. Cooch. The company will erect a plant at Reno, Nev., for manufacturing ingot steel sheets, rolled by the American Rolling Mills Co., into corrugated culverts for sale in the states of Nevada and Montana.

The Windsor Machine Co., Rutland, Vt., recently broke ground for its new shop which it is planned to have completed by June 1, next year. The capital stock of the company has been increased from $75,000 to $225,000.

The Iowa Central railway has announced plans for the second addition to its machine shops at Marshalltown, Ia., which will be built as soon as possible. The company is now completing an extensive addition to the shops.

The Elmira Machine Works, Grover, Pa., will move to Union, N. Y., within three months. Two new buildings will be erected, one of cement block, two stories, 40 x 100 feet, and the other, one story, of brick, 35 x 75 feet.

William T. Davoren, Denver, Colo., has completed plans for a brass works and foundry to be built on Twelfth street, between Lawrence and Larimer, estimated to cost $10,000. It is planned to have the new plant ready for business Jan. 1.

The Burlington Brass Works, Burlington, Wis., has begun excavating for an addition to its plant. The structure will be 75 x 100 feet in dimension, and the equipment will be of the most modern type. The addition will be completed within two months.

The J. M. Kohler Sons Co., Sheboygan, manufacturers of enamel ware and plumbers' supplies, is erecting a new power house, 110 x 140 feet. Plans are also under way for the erection of a 200-foot addition to the enameling department of the plant.

The Stoever Foundry & Mfg. Co., Myerstown, Pa., founder and machinist, advises respecting some recently noted new construction, that the addition to its machine shop will be one story, 24 x 80 feet, to be used for storage and exhibition purposes.

The new machinery equipment that will be installed in the new building of the Shelby Tube Co., at Ellwood City, Pa., is being received. The equipment includes three 10-ton Amer-

ican electric cranes, two cut off machines, an upsetting machine, and a straightening machine.

The Standard Brass Foundry Co., 6522 to 6532 Central avenue, Cleveland, has purchased a site, 50 x 200 feet, adjoining its present property. Another foundry building will be erected, thereby increasing the aluminum department of this concern practically three-fold.

The Detroit Gear Grinding Co., Detroit, of which George P. Codd is president, has taken out a building permit for a two-story concrete and steel shop at Chene street and the boulevard. Construction work will begin shortly. The company will build machines for grinding gears.

The Lyons Boiler Works, of DePere, Wis., is planning to build an addition to the shop at DePere, and also to erect a plant at Green Bay, at an estimated outlay of $50,000. The addition contemplated is a building 150 x 300 feet, to the boiler shops, and an extension 60 x 110 feet to the foundry.

The Simonds Mfg. Co., manufacturer of saws, machine knives, files and hack saws, recently has added to its Chicago plant 14,000 square feet of floor space, with a view of increasing the capacity of a few of its departments. Practically all requirements for this addition have been provided for. The company recently replaced the steam engines in its crucible steel rolling mill with electric motors.

The Kissel Motor Car Co., Hartford, Wis., has begun the construction of a power house, 44 x 80 feet, which will be ready for operation by Dec. 1. A new 500-horsepower tandem compound engine with condenser outfit has been purchased by the Kissel company from the Nordberg Mfg. Co. of Milwaukee for installation in the new power plant. New electrical equipment will also be installed by the Kissel company.

The Madison, Wis., branch of the International Harvester Co. will have its warehouse capacity more than doubled by the erection of a three-story addition, now in course of construction. The offices of the company will be moved into the new building and the present office quarters will be used for storage purposes. The company is also building another one-story structure to be used for the storage of heavy machinery.

The New Method Stove Co., Mansfield, O., is having plans prepared for an addition 60 x 125 feet, with a wing 110 feet long, 100 feet wide at one end and 40 at the other, one story. It will be used by the enameling department and for storing castings and crating lumber. The larger structure will be three stories, the tin ship and shipping department being placed on the first floor, and the mounting room on the second floor, while the third floor will be used for storing finished materials. The foundation is being put in, and the superstructure will be added as fast as possible.

General Industrial:—

The Badger Brass Mfg. Co., Kenosha, Wis., has increased its capital stock from $50,000 to $200,000.

The Burke Machinery Co., Cleveland, machine tools, has increased its capital stock from $20,000 to $80,000.

The property formerly owned by the Aluminum Co. of America is being shipped from Connellsville, Pa., to Clarksburg, Va., having been purchased for the United States Aluminum Co.

Charles L. Kinney Co. has retired from the Federal Brass Foundry Co., 319 Hydraulic avenue, South Bend, Ind., and the business in the future will be conducted by George E. Rush.

What is probably the largest paper-making machine in the world is being manufactured by the Beloit Iron Works of Beloit for the Chester Fairbanks Co., Alton, Ill. The machine is 300 feet long, weighs 500 tons, and will have a capacity of 75 tons daily.

The directors of the Savage Machine Co., Freeport, Ill., elected these officers at its recent annual meeting: President, George Ennenga; vice president, Z. T. F. Runner; secretary-treasurer, W. G. Krape; manager, M. A. Scott; superintendent, E. E. Savage.

E. P. Miller and T. I. Wasson have purchased the holdings of W. J. Heald, in the Lenox Furnace Co., Marshalltown, Ia. Mr. Heald has been manager of the property since the present company bought it four years ago. Mr. Miller will succeed Mr. Heald as general manager of the Lenox company.

The Milwaukee Concrete Mixer & Machinery Co., Milwaukee, advises respecting its recent incorporation that it was formed to build the Milwaukee concrete mixer, and will be in the market for steam boilers, engines, gasoline engines, motors, structural steel shafting, sheet steel, steel wheels to be used on trucks, rivets, bolts and steel castings.

The Prest Machine Works, Oklahoma City, Okla., machinist, advises that while it has had its business established about seven months, it has finally incorporated. For a number of years the Prest brothers were with the G. W. Mfg. Co., Leavenworth, Kans., one employed in the office and the other in the shops. The company has constructed a building, 30 x 60 feet.

The Titchener-Culver Iron Works, West Oneonta, N. Y., iron and brass castings, advises that its main building is 40 x 80 feet, and it plans a daily output of eight to ten tons. A Whiting cupola will be installed shortly. The company plans to turn out structural iron castings extensively, together with the Babcock hard pan plow, as well as do a general jobbing business.

The Knecht Planer Co., 819 Wade street, Cincinnati, successor to the Knecht Bros. Co., announces that it has disposed of its drill business to the Crane Machine Tool Co., Cincinnati. Further announcement is made that the Knecht company is about to enter the market with a high-speed planer, variable-speed extension, power-controlled throughout. The company has been developing this machine for the past three years, and is now ready to book orders for 1910 delivery.

Trade Notes:—

The Metropolitan Bridge Co., which recently began the operation of a structural shop in Jersey City, N. J., has located its offices in the World building, New York, where the Syracuse Bridge Co. also has offices. The Metropolitan company was located for a time at 26 Cortlandt street.

The American Specialty Co., of Chicago, recently was appointed sole export agent for the line of portable electric drilling machines manufactured by the Van Dorn Electric & Mfg. Co., of Cleveland, O. The American Specialty Co. also has the agency for these tools in the Chicago and central western districts.

Fires:—

The gray iron foundry of Henry Tries, Paterson, N. J., was badly damaged Nov. 2, the loss being estimated at $8,000, on which $3,000 insurance was carried.

The office building at the City furnaces of the Sloss-Sheffield Steel & Iron Co., at Birmingham, was destroyed Nov. 21, the loss being estimated at $8,000.

The wire nail plant of Peck & Benny, Mill street, Montreal, Can., was damaged to the amount of about $12,000, Nov. 19.